AMERICAN ARTISAN

RESIDENTIAL AIR CONDITIONING
WARM AIR HEATING • SHEET METAL CONTRACTING

DECEMBER
1939

ABLISHED
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LAMNECK SERIES 700 SYSTEM
PREFABRICATED DUCT AND FITTINGS

GREATER FLEXIBILITY

Takes Care of More Jobs With Fewer Parts and Smaller Investment

• In its complete adaptability to the requirements of all types of installations, however complex, Series 700 System is a triumph of skilled and sound engineering. With far less parts than any system heretofore produced it is so extremely flexible that the combinations which can be made from Series 700 are practically unlimited.

Yet, so accurately is it engineered that in every case to which it is applied this advanced system achieves a high standard of efficiency never before approached in the history of the industry. At the same time its remarkable ease and simplicity of assembly and installation—with less cutting, fitting and complicated figuring—substantially reduce waste and lower costs of both material and labor to an unheard of degree.

With fewer parts, which are more flexible and interchangeable, smaller stocks are required and less investment necessary to carry everything you need in Series 700 System to meet all requirements.

Simplifies Ordering, Shipping and Stocking

Storing and shipping are also simplified so as to produce a much lower handling cost. Yet you will be more completely equipped than ever before to take care of a wider range of installations and make a bigger profit. You'll appreciate this fact when you see this amazing new line.

Write for Name of Your Nearest Distributor

LAMNECK PRODUCTS, INC.

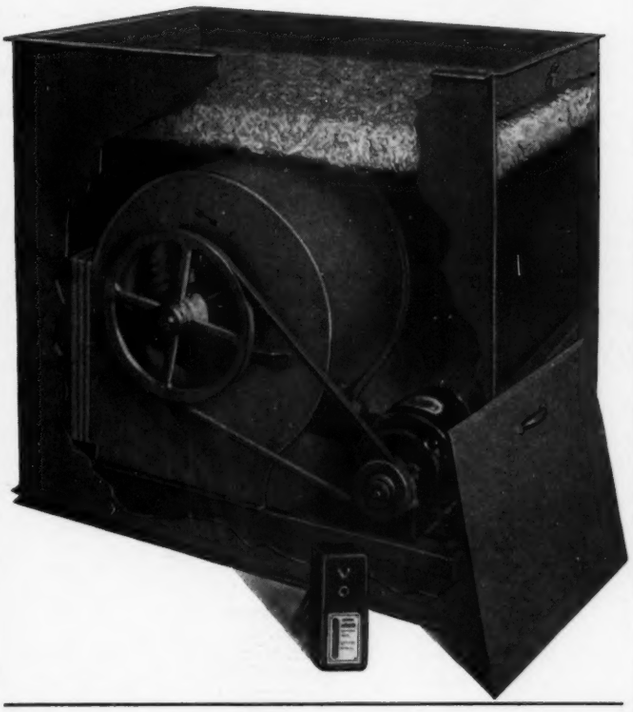
414 DUBLIN AVENUE • COLUMBUS, OHIO

PREFABRICATED DUCT AND FITTINGS FOR ALL TYPES OF RESIDENTIAL WARM AIR HEATING AND AIR CONDITIONING SYSTEMS

$39.95

COMPLETE WITH BLOWER SWITCH

Furblo
No. 7102



1300 CFM — This is guaranteed capacity at ⅛-inch static pressure of the regular No. 10 FURBLO included in this complete No. 7102 Package Unit.

¼ H. P. Motor — Long hour duty type, 110-V., 60 cycle, 1 phase, A. C., meets all power company requirements. Automatic overload cutout. Has 50% more POWER than 1/6 hp motor usually supplied with blower of this size.

720 SQ. IN. — Filter. One 24"x30" throw away type fibre filter. Can be cleaned several times by tamping. Note: 2 extra replacement filters free if you send cash with order.

Cabinet dimensions 25"x31"x27" high. Access door in rear. Single speed drive. Blower wheel is the exclusive and patented FURBLO Electric-Arc-Welded construction.

Why This LOW Price?

—To help you prove to your own complete satisfaction that mid-winter conversion jobs are PROFITABLE for YOU, we are offering a strictly limited number of these units in this size and type only and at this unusually low price.

2 Extra Replacement Filters If You Send Cash With Order — FREE

➡ Mail the Order NOW ⬅

Furblo Co., Hermansville, Michigan

Ship at once No. 7102 FURBLO Package Units at $39.95 each, f.o.b. Hermansville, Mich., with the distinct understanding that if I am not completely satisfied with them, I can return them within one week for full credit and refund of all transportation charges.

30-DAY TERMS — Invoice through my jobber (whose name and address are given below) on regular 30-day terms.

CASH WITH ORDER — I enclose check and as a special cash-with-order premium you are to include in the shipment 2 EXTRA replacement filters FREE OF CHARGE.

My jobber's name and address are [Please give this information whether you send cash or not]:

.....

.....

My name and address are:

.....

.....

.....

AMERICAN ARTISAN

WITH WHICH ARE MERGED

FURNACES AND SHEET METALS

AND

Warm-Air Heating

Covering All Activities in Residential Air Conditioning and Small Commercial Cooling, Warm Air Heating, Sheet Metal Contracting and Fabricating

J. D. Wilder, Editor — A. A. Kennedy, Assistant Editor

Vol. 108, No. 12 — December, 1939 — Founded 1880

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In This Issue

•

IN the shop of Atlas Electric Devices, where Edward Williger fabricates the interesting sheet metal items related on page 50, numerous practical devices have been worked out to simplify production. The photograph on the cover shows Mr. Williger and his mechanic squaring a sheet of auto body stock on a small shear. To insure close cutting the long galvanized iron light shade was worked out to throw light directly on the scratch marks.

•

S. Konzo, on page 29, concludes his three-part series on controls for mechanical warm air heating systems. The discussion in this issue covers control hook-ups for two-speed fan operation—a much discussed method of operating the fan. In addition to the data presented here, Mr. Konzo has also prepared the answers to a number of common questions asked about two-speed fan operation. These questions and answers are not restricted to Research Residence tests and will be published in a future issue. If you have any questions, we will be glad to transmit them to Mr. Konzo and request an answer.

•

On page 34, B. L. Schwartz, Pittsburgh, relates an experience with high side-wall registers where the results were alarming. He concludes from this experience that high side-wall locations can and do invite trouble. About February we expect to publish another article, by another eminent engineer, who, from his experience, believes high side-wall registers are the answer to all heating problems. We invite you to sit in on this argument.

•

Lawrence Gichner, who has written some mighty practical articles in past issues produces another (page 48) in which he tells how he sells sheet metal show windows in direct competition with standard-stock windows.

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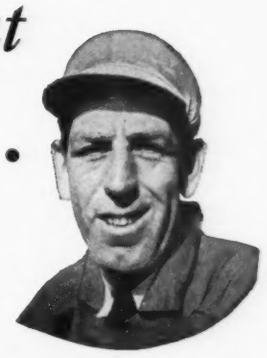
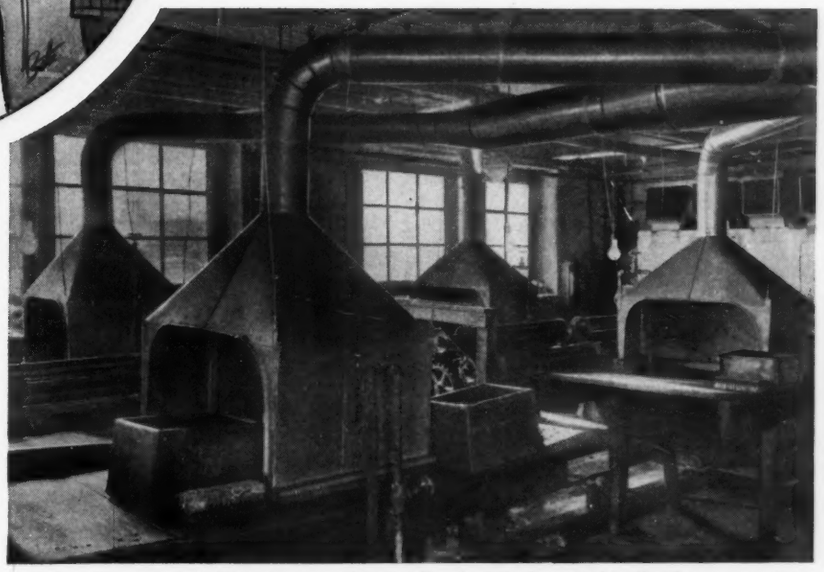
More than 8,000 copies of this issue are being distributed

Talking About HATS...



BY TIM SHEARS



The hoods under which the process of shrinking hats begins. As in all subsequent operations, the hoods and ducts are made of Monel . . . an easy sheet metal job that gives the contractor better than average profits.

I SUPPOSE it's the same in your town as it is in New York. Every dame you see has a crazier hat than the last one.

Some of these lids look to me like blinkers off a horse. I see one gal bump into a lamp post because she didn't look up in time. Another looks like somebody up-ended a flower basket on her bean. But that's not the worst of it. If us men don't watch out we'll be in the same boat ourselves.

"I'm looking over some hats the other day," says a guy at the office, "when my wife cuts in. 'Try this on, dear,' she says, an' she sticks one of these contraptions on my head that's trimmed with rope and feathers. 'How do you like that, sweet?' she smiles. 'Swell,' I says, 'only...I never learned to yodel!' "

Well, anyway, there's one good thing about all these new hats. They make work for sheet metal contractors. An' a chance for landing some juicy jobs in Monel. In a hat factory I see not long ago, some sheet metal man certainly did a swell job for the hat maker an' also himself. Take hoods and ducts alone, for instance.

There's four hoods where they start shrinking the hats with hot water. Of course, plenty of vapor condenses on these hoods. The maker knows that rust or verdigris would ruin the hats, so Monel is a natural for this part of the job.

Next the hats go through a "Multi-roll" machine. There a spray arrangement inside every hood keeps pouring boiling water on the rolls. They say vapor from this machine is somethin' fierce. But with Monel hoods there's never a bit of trouble. Next thing happens to the hats is the blockin'. That gives 'em their final shape. Here there's an extra job for Monel. It's used for the hoods and risers, and the wooden tanks set under the hoods are lined with it, too.

In other textile plants where sheeting, cloth and suchlike is made, Monel is just as common. Dye tanks, batch cans, troughs, utensils an' what have you are made of it. Then take trucks, dryers, bins and table tops. They got to be smooth an' clean an' rust proof. So Monel is a cinch for them too.

By the way...if you need any dope on working Monel, or on soldering or welding it, just drop me a line. Always glad to answer questions.

An' don't forget that chapeau shops an' textile plants are swell prospects for jobs in Monel.

TIM SHEARS

THE INTERNATIONAL NICKEL COMPANY, INC.

67 Wall Street **New York, N. Y.**

"Monel" is a registered trade-mark of The International Nickel Company, Inc., which is applied to a nickel alloy containing approximately two-thirds nickel and one-third copper.

"Work goes easier and faster because

WE'RE GENUINE SHEET METAL SCREWS!"

Once Parker-Kalon Sheet Metal Screws go on the job, contractors know immediately that they are using screws which "have what it takes" to give them consistently satisfactory results every time!

Genuine Parker-Kalon Screws have uniform accuracy and full threading from point to head. They not only go in easily and hold securely but have threads that won't strip and heads that won't pop off. All these points add up to just one result—jobs are completed in less time, with less effort and at less cost.

That's why today more than 40,000 users demand these genuine Sheet Metal Screws. That's why it will pay you, too, to insist on *Parker-Kalon*. That name is your guarantee of assembly economy.

PARKER-KALON CORP., 200 Varick Street, New York, N. Y.

4 REASONS WHY YOU CAN DEPEND ON PARKER-KALON SHEET METAL SCREWS

1. **UNEXCELLED LABORATORY FACILITIES** . . . the Parker-Kalon Laboratory which controls and maintains the high standard of quality for which Parker-Kalon Screws are so widely recognized, represents an investment of over $250,000.
2. **SPECIALIZED PRODUCTION EQUIPMENT** . . . is required to produce Parker-Kalon Self-tapping Screws and to maintain their uniformly high quality. The Parker-Kalon plant is famed as the most up-to-the-minute in the industry.
3. **FREE ENGINEERING SERVICE** . . . to help designers and production men obtain better fastenings at lower cost. Available throughout the country, Parker-Kalon Assembly Engineers render free service to both users and prospective users of Parker-Kalon Self-tapping Screws.
4. **AVAILABLE EVERYWHERE** . . . no matter where your plant is located there is a reputable supply house distributing Parker-Kalon Screws . . . assuring you a dependable source of supply.

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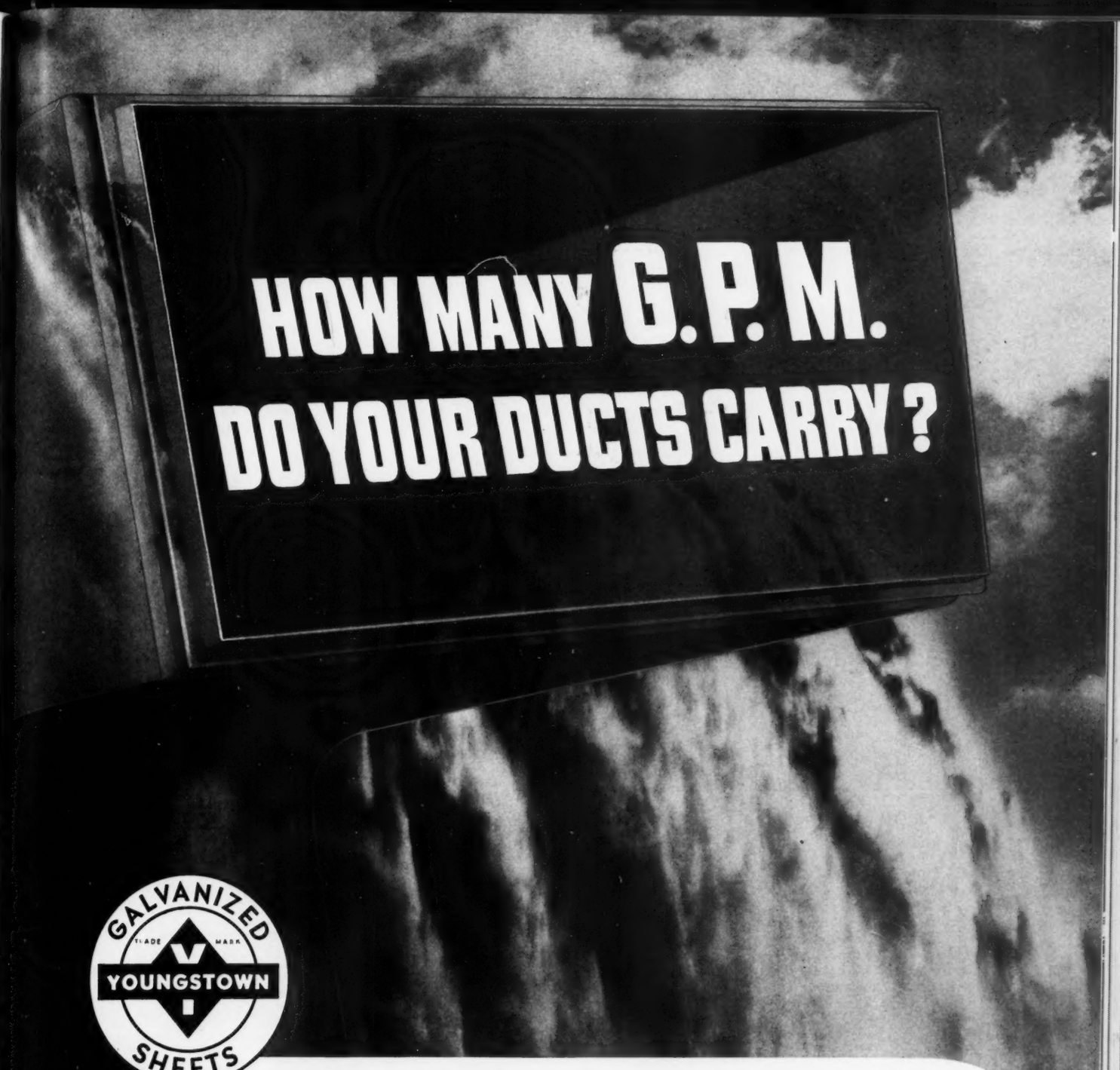
SOLD ONLY THROUGH RECOGNIZED DISTRIBUTORS



GALVANIZED
TRADE MARK
YOUNGSTOWN
SHEETS

★Conditioned air is moist air, carrying literally gallons of water through the duct work, and "How many gallons per minute?" is a fair question.

Leading heating and ventilating contractors, well aware of this water and corrosion problem, are providing ample protection for their installations and their business reputations by using Youngstown Galvanized Sheets.

A ductile base metal, made especially for galvanizing, is thoroughly cleaned, and galvanized slowly to provide a generous measure of zinc coating. As a result, Youngstown's Galvanized Sheets not only work well and form easily but also offer a full measure of continuous protection against the ravages of heat, dust, moisture, and corrosion.

For the sake of a job well done and for the development of more repeat business in the future, buy Youngstown Galvanized Sheets.

Sheets - Plates - Pipe and Tubular Products - Conduit - Tin Plate - Bars - Rods - Wire - Nails - Tie Plates and Spikes. 10-10B

THE
YOUNGSTOWN
SHEET AND TUBE COMPANY
Manufacturers of Carbon and Alloy Steels
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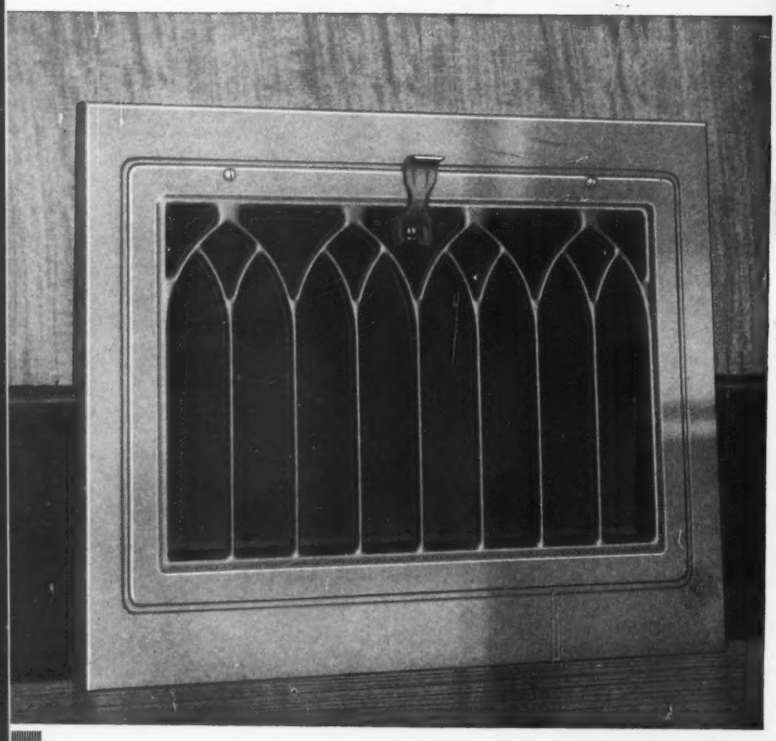
The BIG 3 IN THE GRAVITY FIELD

are Products of

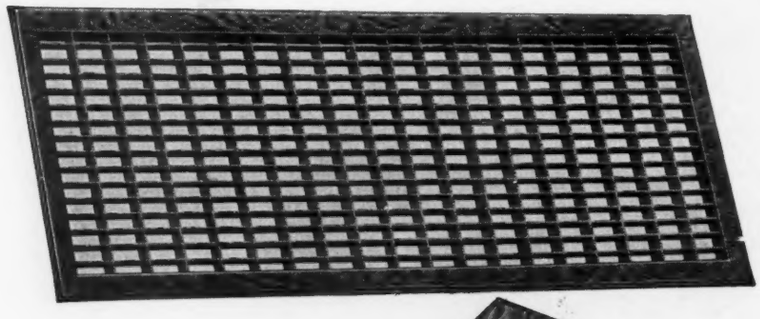
H&C



—a thoroughly sound endorsement by the majority of installers of the superiority of H & C Registers. If you, like most alert installers, believe that it pays to handle the best in registers, but are not using H & C items, by all means inspect them at your H & C Jobber and compare them with what you are now using. You'll find that they are superior in design, in construction, in finished workmanship—the things that can be counted upon to help make sales. Yet they cost not one bit more than ordinary registers. No. 37 Catalog showing the complete gravity line will be sent on request.

1

The classic design of the H & C No. 120 Baseboard Register and its dignified air of refinement, are greatly appreciated by home owners. Neat, tight and secure installations, assured by lapping the stackhead over the register frame, make for complete and lasting satisfaction.



2

The H & C No. 265 "NO-FLEX" Return Air Face matches the No. 210 Floor Register. Cross members are welded to each other and to the frame for maximum strength. Upper edges of members are squared for improved appearance. Corner joints are invisible. Margins are narrow for close installation.

3

At right is the H & C No. 210 "NO-FLEX" Floor Register—the most popular floor register ever built. Openings are 7/16"x1-7/16". Exceptionally sturdy, rigid, and heel-proof.

HART & COOLEY MANUFACTURING CO.

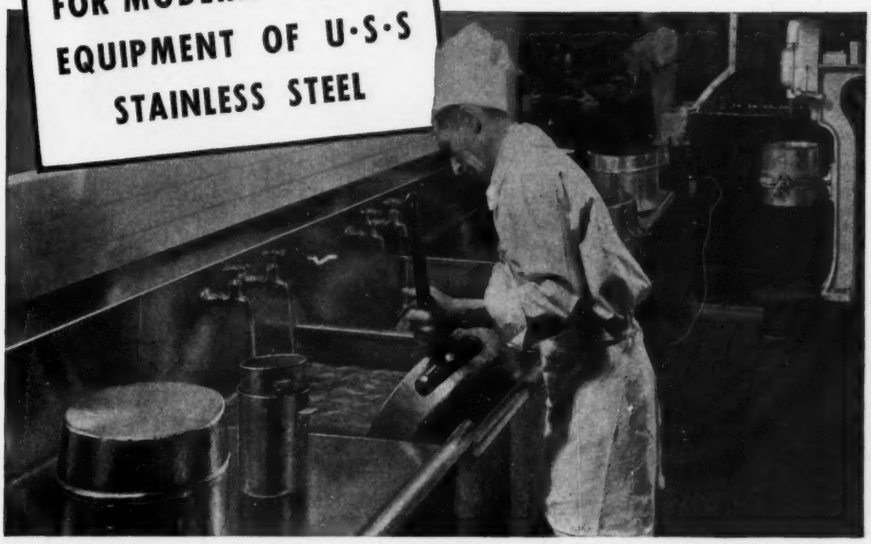
Warm Air Registers · Damper Regulator Sets · H&C · Air Conditioning Grilles · Dampers, Chain, Pulleys

61 W. KINZIE STREET, CHICAGO, ILLINOIS

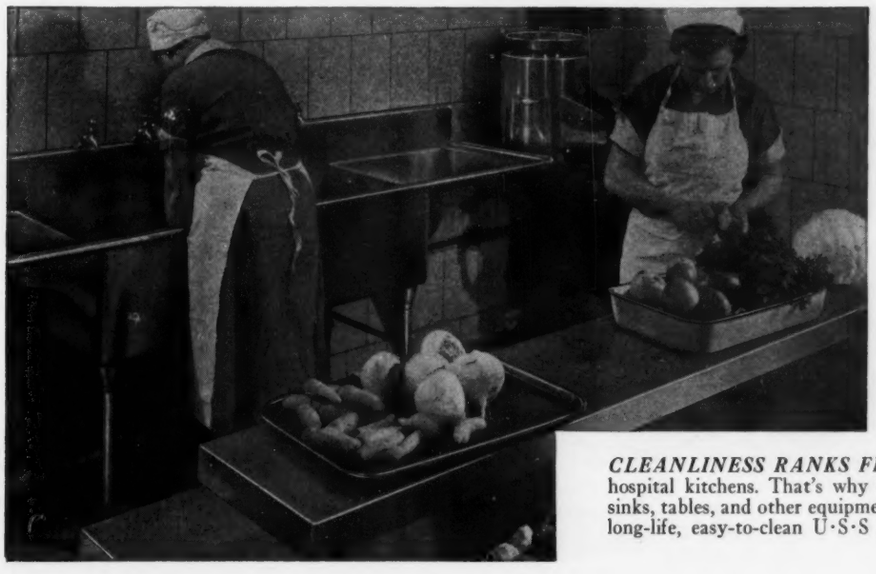
ENGINEERING OFFICE AND FACTORY · HOLLAND · MICH·

Are *YOU* cashing in on this business?

THERE'S A BIG MARKET FOR MODERN KITCHEN EQUIPMENT OF U·S·S STAINLESS STEEL



HERE IS THE NEWEST of several U·S·S Stainless installations in the kitchen of an exclusive men's club. An 18-foot sink for washing pans. It was specially designed to fit a narrow space. It is an investment in cleanliness that will continue to pay dividends over a long period of years.



CLEANLINESS RANKS FIRST in the list of requirements for hospital kitchens. That's why the superintendent here is replacing sinks, tables, and other equipment as rapidly as can be arranged with long-life, easy-to-clean U·S·S Stainless Steel.

SHEET metal workers report a rapidly growing market for kitchen equipment fabricated to order from U·S·S Stainless Steel.

Hotels, restaurants, clubs, hospitals have had ample time to test out their original installations of stainless equipment. And finding that this metal lives up to every claim made for it, they are replacing old equipment as it wears out with bright, easy-to-clean stainless steel.

As more and more organizations find out that stainless steel equipment cannot rust, chip, or peel, that it is always easy to keep clean and sanitary, that there is no practical limit to its service life —as users find out these things about stainless, isn't it logical that the call for stainless equipment should increase?

That is exactly what is happening. And here is an opportunity for you to carve out some very tidy profits in a business that is sure to grow. Write for complete data and fabricating instructions on U·S·S Stainless Steel.

U·S·S STAINLESS STEEL

AMERICAN STEEL & WIRE COMPANY, *Cleveland, Chicago and New York*
CARNEGIE-ILLINOIS STEEL CORPORATION, *Pittsburgh and Chicago*
NATIONAL TUBE COMPANY, *Pittsburgh*

Columbia Steel Company, San Francisco, *Pacific Coast Distributors* · United States Steel Products Company, New York, *Export Distributors*
Scully Steel Products Company, Chicago, *Warehouse Distributors*

UNITED STATES STEEL

GLASS THAT STRAINS AIR
ABOUT THE LAST PLACE you would look for a miracle is in those dry-as-dust reports, "Biennial Census of Manufacturers."
And yet, there *is* one in Bulletin 1310, dated January 21st, 1939. Look under "Air Conditioning."
Here, behind cold facts and figures, is depicted the miraculous growth of an industry . . .
. . an industry which has brought clean, warm-air heat to homes—made rail, air, and bus transportation more comfortable—helped keep store merchandise cleaner—provided better working conditions in factories and offices—and to theaters, restaurants, and schools has brought pleasanter, more enjoyable surroundings.
And Fiberglas, also an infant industry, is proud of the important contribution it has made to the growth of air conditioning.
For to "condition" air completely, you must *clean* it, as well as control its temperature and humidity. And for a time, the expansion of air conditioning, into fields where moderate-sized equipment was needed, was held back because of the high cost and inflexibility of mechanical air filters.
Dust-Stop Air Filters,* made of Fiberglas, solved this problem with the introduction of the first inexpensive, replaceable air filters. Their economy, efficiency, and convenience enabled the air-conditioning industry to greatly broaden its market. For example, domestic forced warm air furnaces were entirely without air filters, until Dust-Stop entered the picture.
But Fiberglas did not stop with Dust-Stop Air Filters. This was only the *first* application of Fiberglas to industry. For since then, this new basic material has grown by leaps and bounds *and in many directions.*
As thermal insulation, Fiberglas keeps heat and cold where you want them: outside or inside. It is used in hundreds of things from homes, cook stoves, and refrigerators to boilers, ice machinery, and ships.
As electrical insulation, Fiberglas is superior to other materials in many fields of electrical generation, distribution, and transmission. Today, leading manufacturers of electrical equipment specify Fiberglas electrical insulations for their toughest jobs.
And because you can twist it into thread, weave it into cloth, you can get glass fabrics, such as draperies, shower
OWENS-CORNING
FIBERGLAS
T. M. Reg. U. S. Pat. Office
FIBERGLAS FOR AIRPLANE PASSENGERS' COMFORT. Pan American Airways and the Boeing Aircraft Company needed insulation for the big 41-ton Yankee Clippers, to muffle the roar of their 6,000 horsepower
cabins against heat or cold.
WE THINK THIS IS ANOTHER WAY TO HELP!
GLASS THAT IMPROVES RADIO RECE
coded or "leak
insulation helps prevent cur-
rent leakage, won't corrode, is flame-proof—points of
interest to purchasers of high-grade radio receiving sets.
AILROADS TURN TO FIBERGLAS. Modern refrigerator cars and sleek streamlined trains are insulated
Fiberglas. It won't settle, helps maintain uniform
deadens sound, imparts no odors, never
rots, and is light in weight.
FIBERGLAS KEEPS COOKS COOLER. Jarring sometimes causes even stove insulation to pull apart or shake down, producing "hot spots." Fiberglas fits snugly, won't settle. This means lower gas or electric bills, cooler kitchens—two points that give stove buyers greater value.
US
YOU

• Every month this fall you've been getting 8,750,000 circulation in Saturday Evening Post, Life, American Home, and Better Homes and Gardens promoting forced warm air heating.

• And *now*—December declares an extra dividend of 1,575,745 in Fortune, Business Week, Time, and Newsweek. Another way to help? We think so!

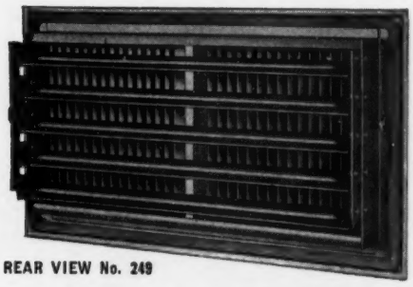
FIBERGLAS* DUSTOP* AIR FILTERS

*T. M. REG. U. S. PAT. OFF.

Manufactured by Owens-Corning Fiberglas Corporation, Toledo, Ohio

Install U.S.200

MULTI-LOUVER ADJUSTABLE BAR REGISTERS for Deluxe Jobs



REAR VIEW No. 249

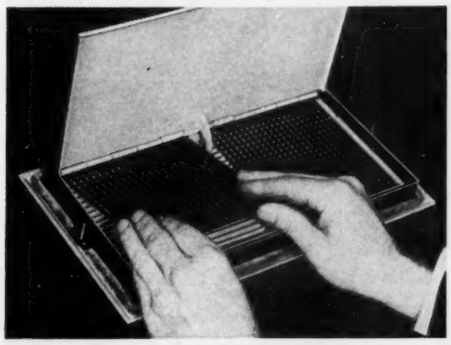
FULL

GRILLE COVERAGE

COMPLETE

Directional Flow

The PEAK of PERFECTION in Multi-Louver Adjustable-Bar Air-Conditioning Registers—proven by the photographs at the right—proven by the acclaim of experienced jobbers and dealers everywhere who know register values thoroughly. It is a Sensibly Designed and Sensibly Constructed Register. There are no puzzling features to develop trouble—no "trick" gadgets. It gives you any desired degree of Up Flow to 45° Down Flow—easily regulated with Side Lever-operated Back-Blades.



It gives you any desired degree of Side Flow to 45° Left or 45° Right—or two-way flow to 45° Left and Right—easily regulated by setting the vertical (key-pin operated) Adjustable Grille Bars.

You'll be just as proud of your U. S. 200 Installations as the customers who buy them. Whenever Multi-louver Adjustable-bar Registers are specified and required, keep this unusual new U. S. 200 Line in mind.

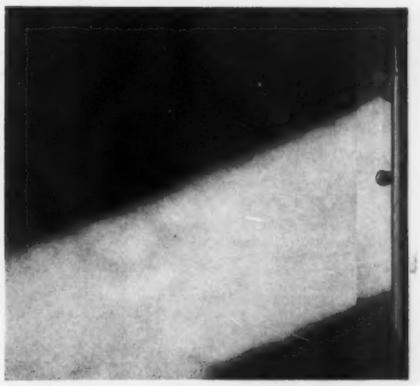
Install U. S. LOUVER TYPE REGISTERS *for Competitive Jobs*

80% of your regular type jobs can be handled to perfection with U. S. Louver-Type Registers with Inset Panels for directional side flows. Up or Down, Right, Left, or Right and Left directional flows are all easily accomplished with minimum register stocks.

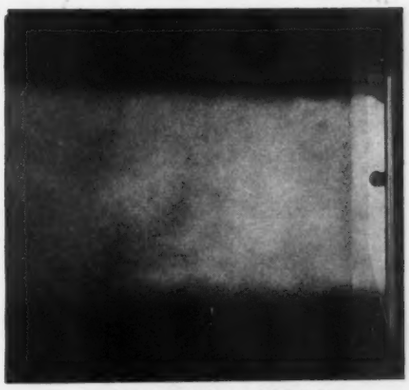
Make our Exhibit Space 444 your Headquarters at the Cleveland International Show. Check your files for our Catalog 27 and latest Register literature.

Candid Camera Proof!

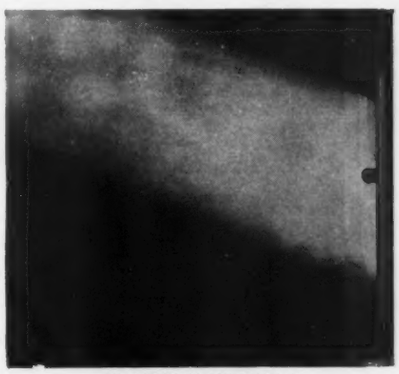
These pictures tell the true story of the full grille coverage of U. S. 200 Multi-Louver Adjustable-Bar Registers. There is no better, sounder way to handle your directional flow requirements.



DOWN FLOW SMOKE TRAVEL AT 450 F. P. M.



STRAIGHT FLOW SMOKE TRAVEL AT 450 F. P. M.



UP FLOW SMOKE TRAVEL AT 450 F. P. M.

Send for Complete Information and Latest Prices

UNITED STATES REGISTER CO.

BATTLE CREEK, MICHIGAN

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Manufacturers of AIR-CONDITIONING and GRAVITY REGISTERS and GRILLES

A Keg or a Carload . . . your order receives *"Scully Service"*

ALLOYS
ANGLES, HOT ROLLED and COLD ROLLED
ARCHES (CORRUGATED)
BABBITT
BANDS and HOOPS
BARS, HOT ROLLED
  ALLOYS (HR and CF)
  COLD FINISHED
  ELECTRIC HIGH CARBON STEEL
  REINFORCING
BEAMS and C. B. SECTIONS
BEEF RAIL
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BORING and TURNING BARS and GRINDERS
BRACES, BOILER
CHAIN, ALL KINDS
CHANNELS
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CHUCKS, STAYBOLT
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CLIPS, PATTERSON
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CONDUCTOR PIPE
COPPER and BRASS
COUPLINGS, HOSE
CRAYONS, SOAPSTONE
CUTTERS
DARDELET RIVET and MACHINE BOLTS
DRILL RODS
EAVE TROUGH and FITTINGS
EXPANDERS, FLUE
FERRULES, COPPER
FLANGES, BOILER and TANK
FLOOR PLATES
GALVANIZED SHEETS, BARS, BANDS, ETC.
HANDLES, HAMMER
HEADS, TANK and FLANGE
HOISTS, HAND and POWER
IRON, STAYBOLT
LUGS, BOILER, TANK and SILO
MACHINERY, HAND and POWER
MANHEAD PLATES and FITTINGS
NAILS
PACKING
PAINT STICKS
PLATE STEEL, STANDARD QUALITIES
  ABRASION RESISTING
  COR-TEN and MAN-TEN
PLUGS, FLUE
RAILS and FITTINGS
REAMERS
SHAFTING
SHEETS
  ABRASION RESISTING
  ELECTRICAL
  COR-TEN and MAN-TEN
  HOT ROLLED and UNIFORM BLUE
  WELLSVILLE POLISHED
  COLD ROLLED
  STAINLESS STEEL
  GALVANIZED and GALVANNEALED
  LONG TERNE
  CORRUGATED
  U-S-S COPPER STEEL
SPRING STEEL BARS and SHEETS
STAINLESS STEEL
STRIP STEEL, CR and HR
TEES
TIRE, ROUND EDGE
TOOLS, HAND and POWER for BOILER and IRON WORK
TROLLEYS
TUBES, BOILER
TURNBUCKLES
VALVES, BLOW-OFF
WELDING ROD and WELDERS
ZEES

USS Scully Service

SCULLY ST. LOUIS WAREHOUSE

"Last Saturday we received a wire from the oil fields requesting immediate shipment of two kegs of Bolts for a break-down job and we made shipment that day."

SCULLY NEWARK WAREHOUSE

"Order for carload of C Beams received at 2 o'clock for use on railroad bridge damaged by flood — shipped same day at 4 o'clock."

BIG or little, your order always gets the same prompt attention from Scully. The Scully business and our famous reputation for quick, friendly, reliable service have been built by recognizing the simple fact that *every* order is equally important to our customers. All eight Scully Warehouses operate on the same principle . . . and our customers know that it pays to call Scully.

Phone, write or wire the Scully Warehouse nearest you the next time you need steel, steel products, copper and brass. Each carries large stocks available for immediate shipment. And ask for a copy of our Stock List and Reference Book—it's free.

SCULLY STEEL PRODUCTS COMPANY

Distributors of Steel, Steel Products, Copper and Brass

CHICAGO · NEWARK, N. J. · ST. LOUIS · BOSTON · ST. PAUL—MINNEAPOLIS
CLEVELAND · PITTSBURGH · BALTIMORE

UNITED STATES STEEL

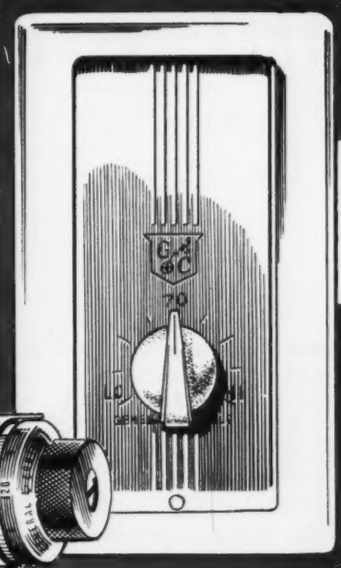
NEVER BEFORE ANYTHING LIKE THIS

a *NEW* ALL-GAS automatic control that opens up a huge new market from people who want automatic gas heat... and now by virtue of this amazing and versatile control can afford to have it today

GENERAL CONTROLS ANNOUNCES THE NEW GENERAL B60-6

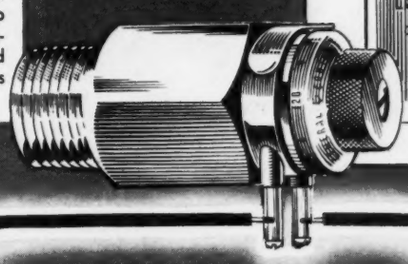
FOR

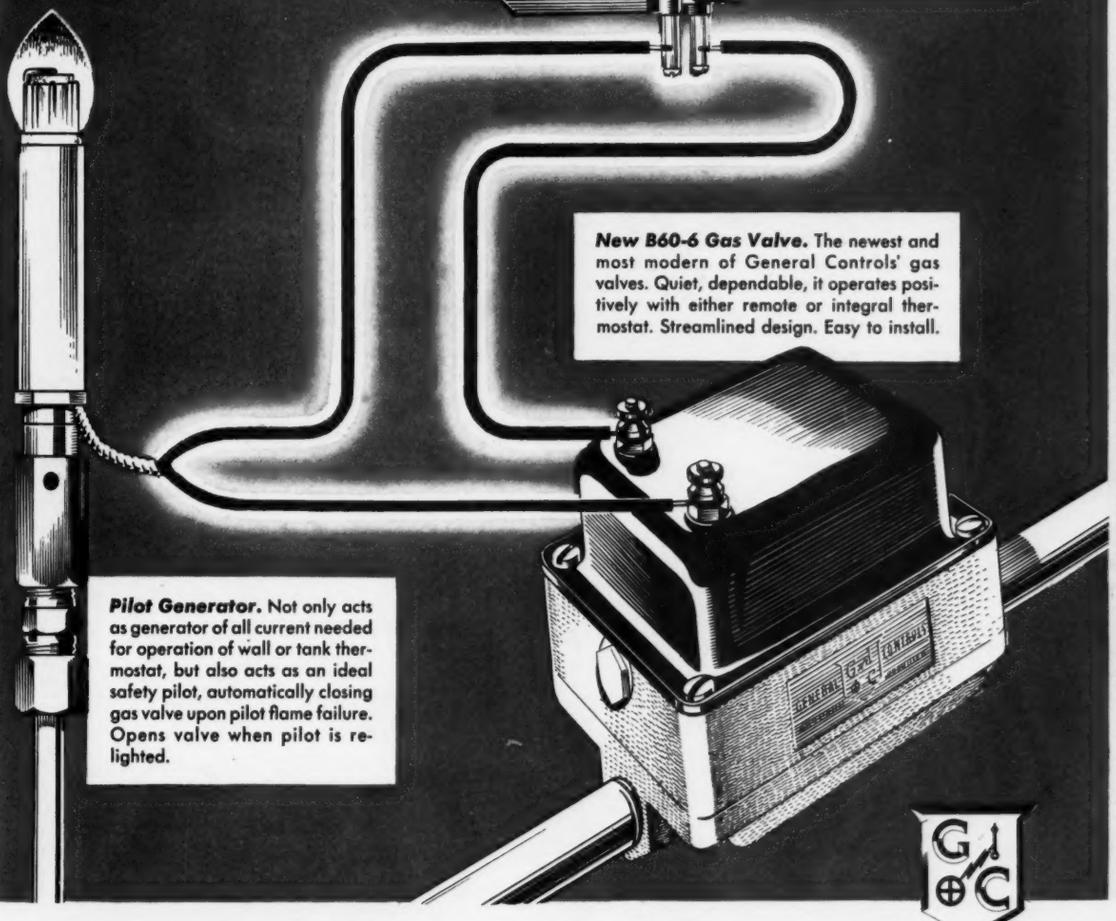
WALL HEATERS, RANGE HEATERS, RADIANTS, FLOOR FURNACES, WATER HEATERS, CIRCULATORS, GAS STEAM RADIATORS



Remote Wall Thermostat. Sensitive and positive in operation. Handsome and attractive in design. Range: 50° to 90° F.; differential: approximately ½° F. Night cutoff available.

Tank Thermostat. For water heaters. Mounts in side of tank. Permits wiring to be brought up through casing, making a streamlined installation. Compact and sensitive. Setting knob provides easy adjustment.





New B60-6 Gas Valve. The newest and most modern of General Controls' gas valves. Quiet, dependable, it operates positively with either remote or integral thermostat. Streamlined design. Easy to install.

Pilot Generator. Not only acts as generator of all current needed for operation of wall or tank thermostat, but also acts as an ideal safety pilot, automatically closing gas valve upon pilot flame failure. Opens valve when pilot is relighted.

FOR WATER HEATERS
Compact, sensitive tank thermostat mounted in tank side with B60-6 Valve under heater.
FOR SPACE HEATERS
New, close differential at low cost. With face mounting, integral thermostat (illustrated) or remote thermostat.
FOR GAS-FIRED RADIATORS
Shown with B60-6 Valve and integral thermostat. Available also with remote thermostat.

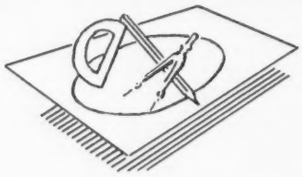
ANOTHER FIRST FOR GENERAL CONTROLS—ANOTHER GAIN FOR GAS

It's all-gas actuated,—no electricity needed. *It's automatic,*—operated by integral or remote thermostat or tank thermostat. *It's inexpensive,*—within the means of most every American family. Costs nothing to operate. *It's easy to install,*—everything furnished in a complete package set. *It's fully tested,*—proved in performance and 100% positive in operation. *It's silent,*—no noises of any kind, starting, stopping, or operating. *It's safe,*—pilot flame failure causes gas valve to close. *It has eye appeal,*—valve and thermostats are attractive, modern streamlined. You, too, will be enthusiastic when you see, inspect and install these amazing, versatile controls. Write today for new bulletin describing the new B60-6 Series Controls Gas Controls.

GENERAL CONTROLS

450 East Ohio Street, Chicago, Illinois • 267 Fifth Avenue, New York City • 1505 Broadway, Cleveland, Ohio • 3626 Wyoming Street, Kansas City, Missouri • 6432 Cass Avenue, Detroit, Michigan • 25 North Live Oak Street, Houston, Texas • 915 Bryant Street, San Francisco, California • 700 West Ivy, Glendale, California • *Distributors in all principal cities*

IT'S THE SHEARING ANGLE THAT COUNTS



For easier, more effortless cutting throughout the entire stroke—it's the shearing angle that counts! Examine the Crescent angle wherever you wish, at the start of the cutting stroke, near the middle or right out at the blade tips . . . Crescent's scientific blade contour maintains the same angle at every point—provides the most efficient shearing angle at all times.

Crescent Snips are completely drop-forged from special analysis steel—manufactured by methods and equipment that are exclusively Crescent's. Blades are hardened all the way through, providing a tough, keen edge that no amount of grinding can ever remove. They are not *sprung* to produce cutting tension, but permanently *ground* to shape from solid forgings.

There is a Crescent Snip for every type of service: 4 patterns, 9 sizes. For better, faster, easier work, specify Crescent Snips. Sold by hardware dealers everywhere.

CRESCENT TOOL CO.
JAMESTOWN, N. Y.

STANDARD SNIPS
S412-12 $1.50
8 sizes-7" to 14"

CIRCULAR CUTTING SNIPS
T412-12 . . $1.75
2 sizes . . 7 and 12"

COMBINATION CUTTING SNIPS
U412-12" . . only $1.75

HEAVY DUTY SNIPS
U416-16 only . . $3.00

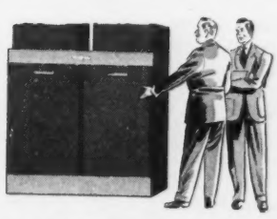
CRESCENT and Smith & Hemenway TOOLS

DON'T HANG UP YOUR SALESMEN 6 MONTHS A YEAR!

WHAT DO YOU DO when the heating season's over? Enjoy a nice long vacation? Good! More power to you...*but what happens to your profits?* Lose contact with your customers and prospects, by having little or nothing to offer, and where are you? Spread six or seven months' net over a year and what have you?

Be a G-E Franchise Dealer

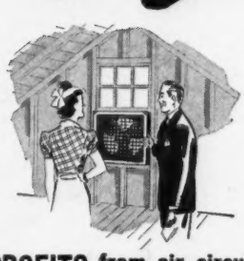
Operate on a twelve-months-basis—have something to sell to *every* prospect—*every* month in the year! G-E's *complete* lines permit it. G-E's merchandising set-up is balanced and backed by G-E advertising, dealer promotion, sales, engineering counsel and support. G-E's Dealer Franchise offers alert dealers the opportunity of building lifetime *success* and *security*. These are just the highlights. Let us fill in the profitable details! Write—or mail coupon today.



PROFITS from automatic heating. Number one backbone of your business—the finest automatic warm air heating equipment, oil and gas fired...and now at lower prices than ever before! And better profits!

PROFITS from home summer cooling. After your heating season is shot—You sell small units for cooling one room up to systems for cooling the entire house...for continued turnover and profits!

PROFITS from commercial air conditioning. Individual store and office cooling units to complete central plant systems for stores, shops, hotels, theatres, restaurants, etc. Also G-E Condensing Units from fractional h.p. up to 60 h.p.



PROFITS from air circulators. Here's a "natural" for low income homes. Also for offices, stores, shops, restaurants, factories, etc. And too...a "natural" for reaching *new* prospects and making *new* profits!

PROFITS from advertising. All the acceptance of G-E in the home, plus leads from national advertising and cooperative newspaper advertising of *your* products, in *your* territory, reaching *your* prospects to build *your* profits!

PROFITS from strong dealer promotion. If it helps you do more business—G-E has it! Direct mail, store identification, displays, literature, specification sheets, mats, electros, sales and engineering training. The best of everything!

Now as never before General Electric is ready to talk profits—
Find out the potentials of a G-E Dealer Franchise—Now!

GENERAL ELECTRIC

Automatic Heating, Cooling and Air Conditioning

GENERAL ELECTRIC COMPANY
Div. 190-853, Bloomfield, New Jersey

Give me details of the new G-E Dealer Franchise for my territory.

NAME.....

STREET.....

CITY.....STATE.....

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For easier, more effortless cutting throughout the entire stroke—it's the shearing angle that counts! Examine the Crescent angle wherever you wish, at the start of the cutting stroke, near the middle or right out at the blade tips . . . Crescent's scientific blade contour maintains the same angle at every point—provides the most efficient shearing angle at all times.

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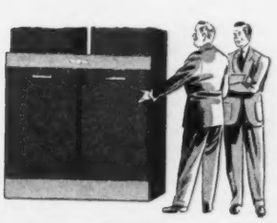

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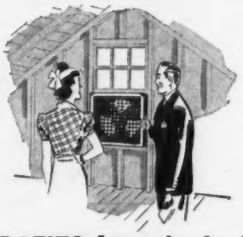

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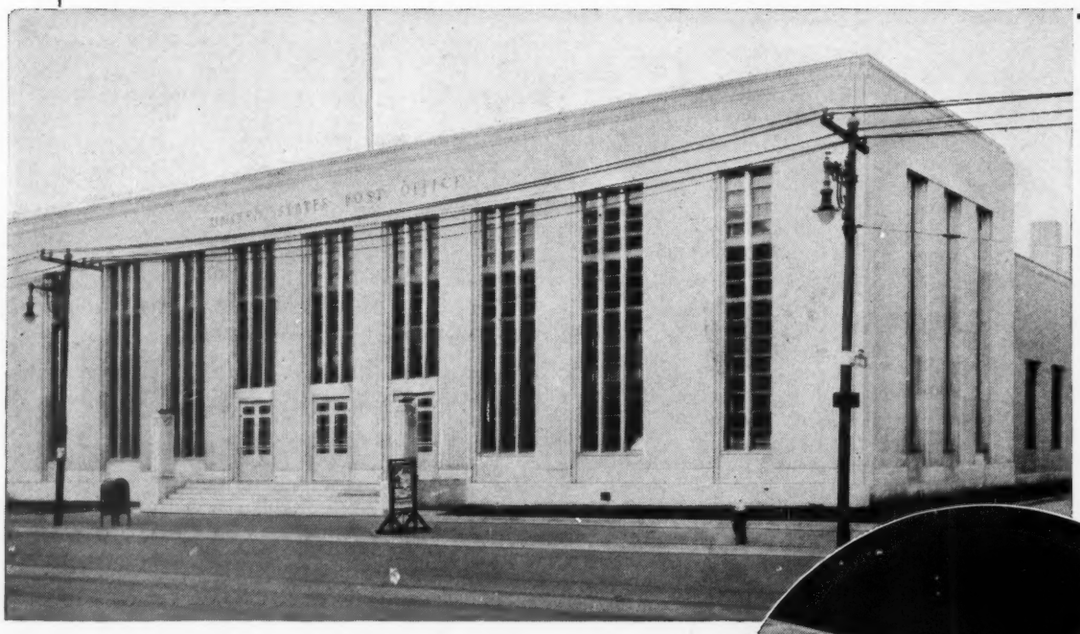
To Control Drainage ...modern buildings use Anaconda Through-Wall Flashing



The new U. S. Post Office at West New York, N. J., designed by Paul Peter Cayot. Anaconda Through-Wall Flashing installed by C. F. Dieffenbach, Guttenburg, N. J., through general contractor Auf Der Heide-Aragona, Inc., of West New York.

It's moderately priced... easy to install... provides lasting efficiency

Masonry walls, being porous, have a tendency to accumulate water until the saturation point is reached...then seepage begins...and unless adequate drainage is provided, outside walls will be streaked and inside finishes damaged.

Anaconda Through-Wall Flashing provides the easiest, least expensive and most positive method of drainage control. So designed as to drain itself dry on a level bed, this flashing prevents lateral movement in any direction.

Made of 16-ounce Anaconda Copper, it is available in 5′ and 8′ lengths in a range of standard and special widths, and with various selvages. Publication C-28 describes Anaconda Through-Wall Flashing in detail.

3988

Corner Flashing Assembly—One-piece corner flashings are installed after straight flashings are in place. Lapping the straight flashings by two corrugations, the corner piece fits snug and secure. Note the bent down weatherlip which makes the completed assembly watertight.

ANACONDA
from mine to consumer

Anaconda Copper

THE AMERICAN BRASS COMPANY, General Offices: WATERBURY, CONNECTICUT

In Canada: Anaconda American Brass Ltd., New Toronto, Ontario · Subsidiary of Anaconda Copper Mining Company

MOST POPULAR

MORE SUNBEAM AIR CONDITIONERS

have been installed than any other make — it will pay you to sell them!

TEN YEARS AGO — when many called air conditioning a new fad with a questionable future — Sunbeam recognized its true value and stepped into first place as a pioneer in air conditioning.

Today because of Sunbeam's untiring research and quality-proved products year after year, more Sunbeam Air Conditioners are installed than any other make.

You can cash in on Sunbeam's national popularity, on its quick consumer acceptance right in your own community. The complete line offers you units in all sizes for all fuels to satisfy any air conditioning need.

Write today for the full facts and for the name of the Sunbeam Jobber nearest to you.

AMERICAN RADIATOR & Standard Sanitary CORPORATION

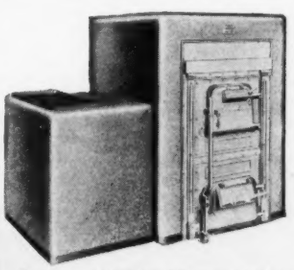
NEW YORK PITTSBURGH

Copyright December 1939, American Radiator and Standard Sanitary Corporation

FHA EASY TERMS

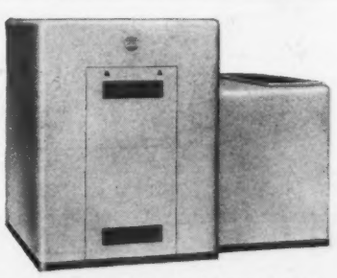
on any Sunbeam Air Conditioner or Warm Air Furnace are easily arranged with our simple Finance Plan that gives you cash on installation.

AMERICAN HEATING EQUIPMENT COSTS NO MORE THAN OTHERS



Sunbeam Air Conditioner Series No. 80. An efficient, moderately priced unit. Models for hand or stoker fired coal or oil.

Sunbeam Air Conditioner Series RB. For automatic gas firing. Highly efficient yet economical in operation.

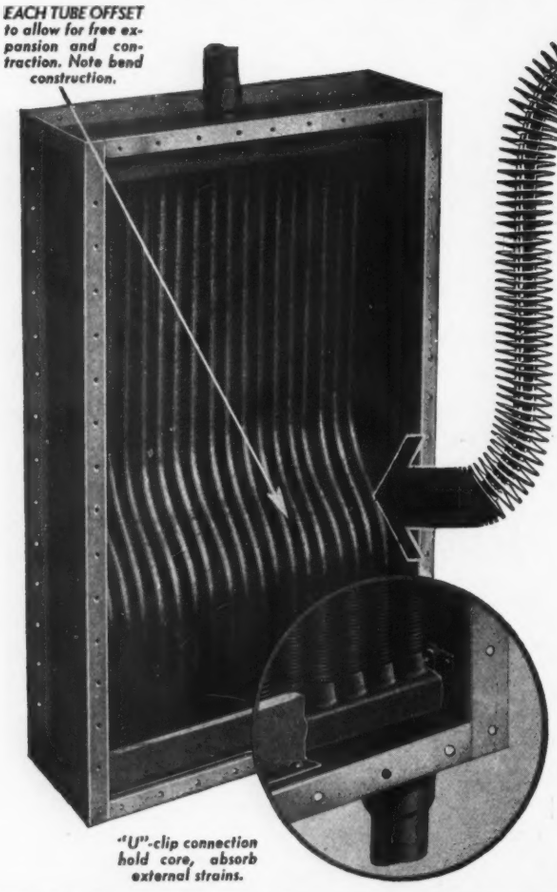


Sunbeam Air Conditioner Series No. 1100. For automatic oil firing exclusively. Burner and Air Conditioner are matched and coordinated.

S-T-R-E-T-C-H-E-S

To reduce your maintenance budget

THANKS to Flexitube's attention-free long life



EACH TUBE OFFSET to allow for free expansion and contraction. Note bend construction.

"U"-clip connection hold core, absorb external strains.

FLEXITUBE STRETCHES

Flexitube's ingeniously designed bend-construction permits:—

1. EXPANSION AND CONTRACTION of Aerofin Flexitube Heating Coils, WITHOUT STRAIN upon themselves, the headers, header joints or the casing;
2. ELIMINATION OF STRAIN TRANSMISSION to headers and joints by expansion and contraction of each tube independent of its neighbor;
3. PEAK HEATING EFFICIENCY because it scientifically cares for sudden fluctuations in heating requirements . . . no chance for injury to coils;
4. ECONOMICAL MAINTENANCE by eliminating expensive heating coil replacements and upkeep. Its "give-and-take" ability abolishes costly heating system shut-downs necessitated by less flexible coils;
5. TRANSMISSION OF ALL EXTERNAL STRAINS to the casing is effected by "U" clip connections which securely hold the core in the casing, but allow
6. FREE EXPANSION OF ENTIRE CORE without distorting external casing;
7. PREVENTION OF EXTERNAL STRAIN, such as weight of connecting pipes, from being transmitted to the core.
8. YEARS OF CAREFREE OPERATION are possible with Aerofin Flexitube Heating Coils as a result of their scientific design, rugged construction, quality materials and craftsmanship.

AEROFIN CORPORATION

410 SOUTH GEDDES STREET • SYRACUSE, N. Y.

CHICAGO DETROIT NEW YORK PHILADELPHIA DALLAS CLEVELAND

Three ways
U·S·S GALVANIZED COPPER STEEL SHEETS
help to Improve your Business

THE use of U·S·S Galvanized Copper Steel Sheets for duct work, housings and heating systems, holds a three-fold advantage for the sheet metal man. This material is easier to handle. The base metal is uniform in size, gage, ductility.

Steel products bearing the U·S·S label are readily accepted by architects, builders, owners. Your clients know that they are getting the best in steel when they see this label.

And when you use U·S·S Galvanized Copper Steel, its longer life aids in building a reputation for quality work. Should the galvanizing become scratched, corrosive elements have less chance of getting a foothold when the base metal is U·S·S Copper Steel.

Use U·S·S Galvanized Copper Steel on your next job. We will gladly send you further information about this superior metal. Write to one of the companies listed here.

THEY MEAN FASTER WORK

"I like the way sheets of U·S·S Galvanized Copper Steel handle. They speed up fabrication . . . make intricate bends and turns easier . . . mean neat, tight seams, good looking ducts."

THEY'RE EASIER TO SELL

"The first thing I look for on sheets is the U·S·S Label. Duct work bearing this label is easier to sell. My clients recognize the name—and have confidence in it."

THEY BUILD REPEAT SALES

"My clients 'stay sold' when I use U·S·S Galvanized Copper Steel for duct work. Its longer life builds good-will . . . results in plenty of repeat trade."

CARNEGIE-ILLINOIS STEEL CORPORATION, *Pittsburgh and Chicago*
COLUMBIA STEEL COMPANY, *San Francisco*
TENNESSEE COAL, IRON & RAILROAD COMPANY, *Birmingham*

Scully Steel Products Company, Chicago, *Warehouse Distributors* · United States Steel Products Company, New York, *Export Distributors*

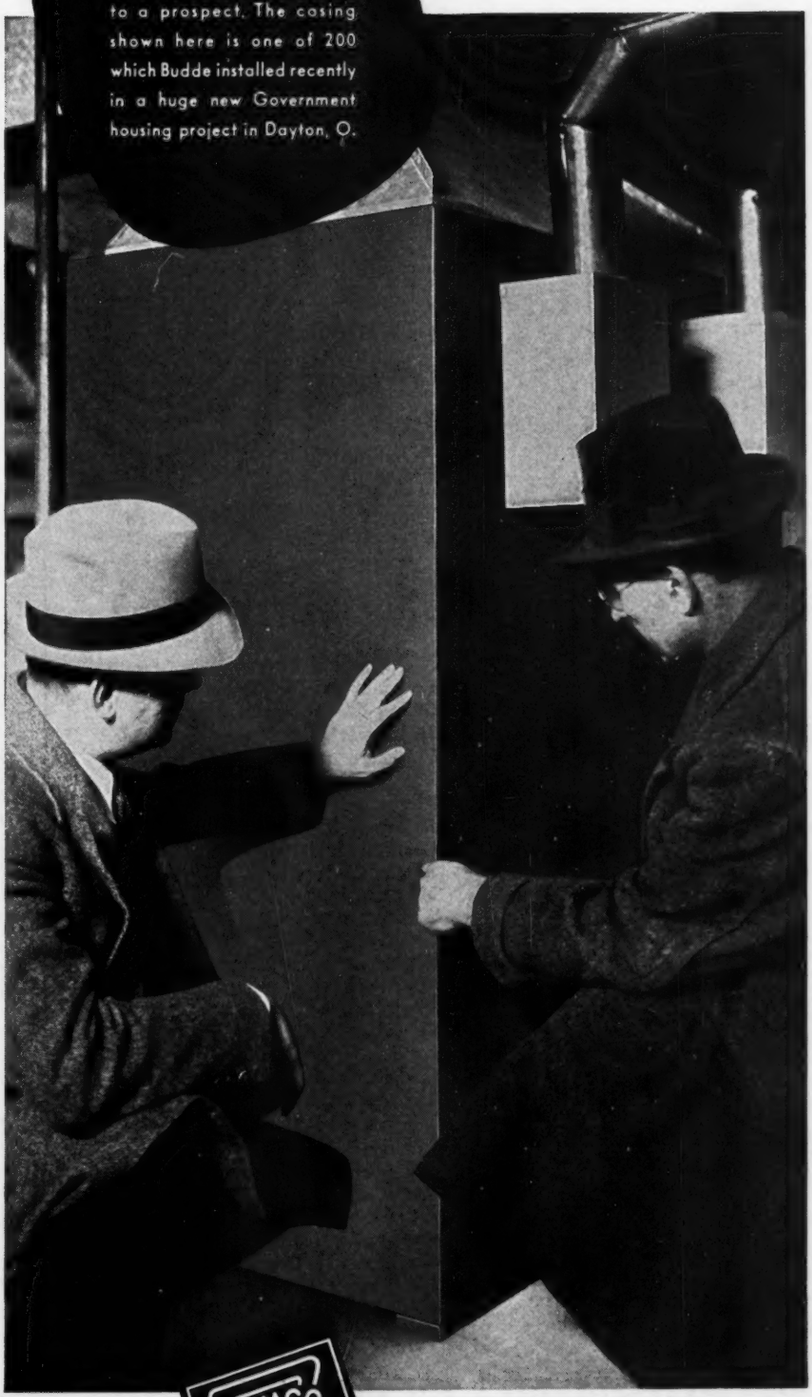
UNITED STATES STEEL

Always meant a lot . . .

NOW MEANS MORE THAN EVER BEFORE . . .

The improved emblem of The Associated Business Papers is symbolic of its greater significance to advertisers. ¶ Its *Standards of Practice*, guide-posts of ethical business paper publishing for twenty-three years, have this year been made stronger and more enforceable than ever before. ¶ Apace with the times, its member publications are constantly making their editorial pages more dynamic . . . increasing their hold on their reader-audiences. ¶ Singly in relation to your markets, and collectively as an association, these modernized A·B·P·A·B·C publications deliver an abundance of what it takes to produce resultful advertising.

sell them beauty with *Paintgrip!*



Contractor Leo Budde, right, explains the "beauty appeal" of a PAINTGRIP furnace casing to a prospect. The casing shown here is one of 200 which Budde installed recently in a huge new Government housing project in Dayton, O.

• The day of the dingy basement is gone. Modern basements are meant to be looked at — and lived in! No wonder then that buyers want good looks as well as durability in their furnace casings and other exposed sheet metal work.

STRONG BEAUTY APPEAL

This is your cue to explain what galvanized ARMCO PAINTGRIP can contribute. This unique metal has all the "beauty appeal" and lasting qualities your customers could ask. Its *bonderized* finish takes paint immediately without special surface treatment. And because the PAINTGRIP finish is neutral, it helps preserve the essential oils that keep paint bright and new-looking. This gives your work the dual protection of a sturdy galvanized coating and a durable, attractive paint job.

YOUR STORY WILL CLICK

Remind your customers of PAINTGRIP's many advantages whenever the work must last and look the part. Notice how favorably they respond. You'll be pleased with the way PAINTGRIP fabricates, too. Experience shows that it forms and solders readily, thus assuring low shop costs and on-time erection.

Galvanized ARMCO PAINTGRIP sheets are available with a base of open-hearth or copper-bearing steel, or extra-durable ARMCO Ingot Iron. For complete information, call the nearby ARMCO Distributor or write direct to The American Rolling Mill Company, 2091 Curtis Street, Middletown, Ohio.

ARMCO

ARMCO PAINTGRIP SHEETS

This Practical

FORCED AIR HEATING DESIGNING MANUAL

Only $1.00

This enlarged, second edition of FORCED AIR HEATING reduces the task of designing forced air heating systems to a simple, easy-to-follow procedure. Four reasons why contractors will find this book unusually helpful—a real time and money saver in forced air work—are these:

First—It contains every kind of information needed for designing forced air heating systems quickly and correctly, including a new "mistake-proof" data sheet, the newest tables, charts, and formulas and other essential data developed by outstanding engineers and research bodies.

Second—It outlines for you, step by step, a suggested designing procedure which you can follow in planning any job in quick time, and yet with assurance that the finished installation will perform according to specifications.

Third—It shows you shorter and easier, but thoroughly dependable methods of calculating heat losses, sizing apparatus, selecting register air temperatures, figuring pressure losses, and determining correctly all other factors that must be considered in planning a forced air heating system.

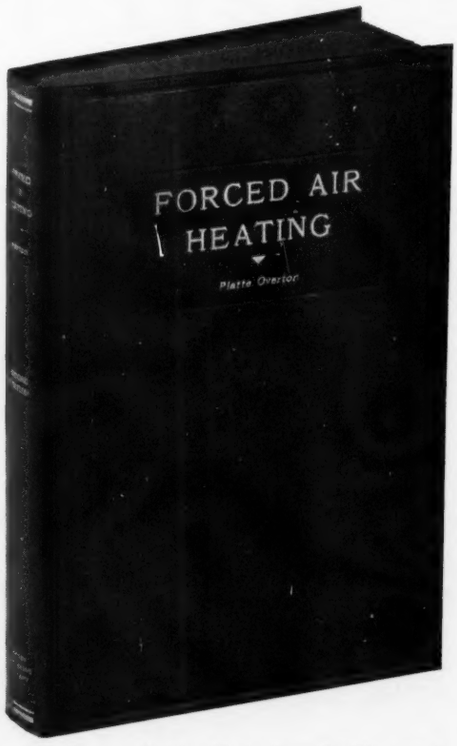
Fourth—It gives you sufficient practical information on all phases of forced air work to equip you to work out readily and correctly any unusual designing problems you may encounter on your different jobs.

FORCED AIR HEATING'S primary object is to show you how your designing problems can be speeded up and simplified. The methods this book recommends are a safe balance between the theoretically perfect procedures which require an excessive amount of time, and the haphazard methods which so often result in costly omissions or mistakes. They are procedures which have been proved completely reliable, as well as important time-savers, through successful application to many hundreds of forced air jobs of all sizes and complications.

WRITTEN IN PLAIN LANGUAGE

Every thought and device to make this second edition a practical, every-day guide to better and more rapid procedure in forced air heating design work has been included in it. It is written in the plainest possible language, and filled with illustrations and concrete examples that make each recommended procedure easy to understand and to apply.

Begin now to improve and to speed up your designing methods—equip yourself to do more and better forced air work at a better profit—by sending $1.00 today to the address below for a copy of FORCED AIR HEATING.



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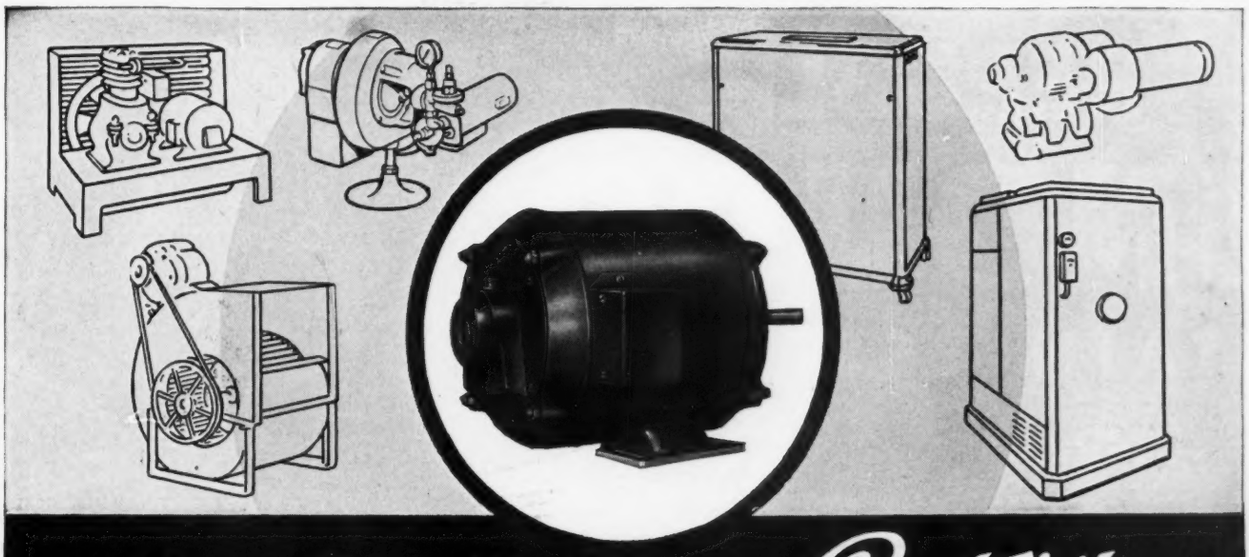

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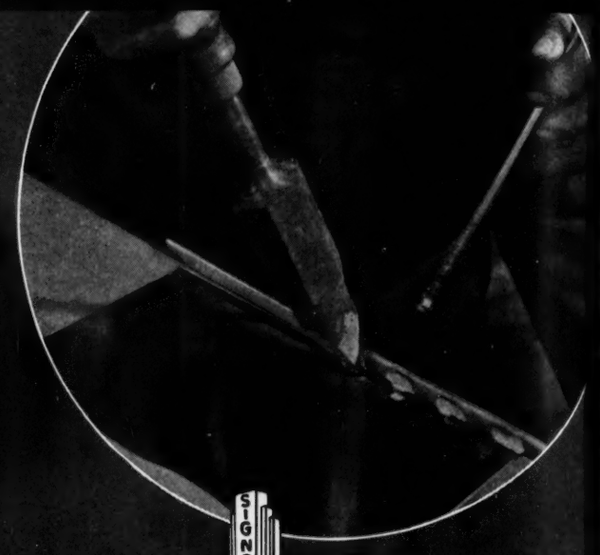

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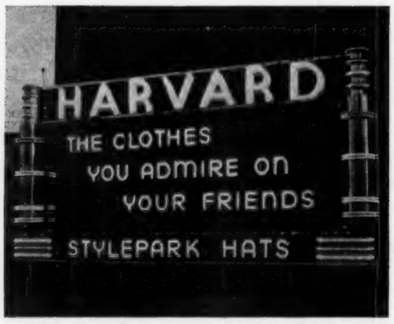

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AMERICAN ARTISAN

Volume 108 Number 12

The New Sheet Metal Association

Elsewhere in this issue we publish the tentative Code of Regulations and By-laws of the proposed new association of sheet metal, heating and roofing contractors which will hold its first annual meeting in the Hotel Carter, Cleveland, January 25 and 26, 1940. These regulations and by-laws have been prepared by the committee appointed several weeks ago in Milwaukee.

It should be borne in mind that these regulations and by-laws are recommendations, subject to revision, adoption and approval at the annual meeting next month. We are publishing the regulations in order that contractors interested in this proposed organization can study the suggestions and attend the meeting prepared to discuss the scope of the program suggested.

The officers of the different state associations who have been preparing the ground work and the contractors who have been working for such a new national contractors association are anxious to have a representative and well-attended convention. The place and the date of this first national meeting were deliberately chosen because the air conditioning exposition will be held the same week in Cleveland and it is hoped that every contractor who attends the exposition will plan to spend another day or two in Cleveland at this meeting.

Even a brief study of the regulations and by-laws indicate that the framers have courageously faced problems which best can be solved through national effort.

If every contractor interested will plan his trip to Cleveland to include the convention, this industry can at least decide whether or not such a national voice is wanted.

◆

Reductions in Small House Costs

"The average *cost* of all non-farm homes constructed in the first six months of 1939 was $3,611 which represents a reduction of more than 10 per cent in three years," is a high spot in the 1939 fiscal year report of the Federal Home Loan Bank Board. "This reduction," says the report, "was brought about chiefly by the increased willingness of families to buy dwellings of smaller size and simpler design and by greater effort of the building industry in meeting mass demand."

A disturbing note, however, is: "Despite such progress, the building industry has a long way to go before the *selling price* of its product will be more fully adjusted to the incomes of the majority of our families." Regarding *selling price* the report says: "The selling price of the majority of newly built homes is still above $5,000, if the costs of land and land improvements as well as sales commissions and profits are included. Income statistics for 1935 and 1936 indicate that only one-fourth to one-fifth of non-farm, non-relief families had an income sufficient to enable them to buy a home costing more than $5,000 on the basis of two and one half annual incomes for a home."

We believe that there is some danger in blindly accepting these comments of the Home Loan Bank Board. During the past year we have inspected many so-called, low cost, homes. We have the general feeling that too many of these houses are deliberately sacrificing many of the things which make home ownership satisfying. Only a week ago we visited five houses advertised for $4,570, including the ground. These houses have no basement (open underneath); partitions are one thickness of ¼-inch insulating board on each side of the studs (studs on 20-inch centers); there is no insulation whatever; heating is supplied by one oil-fired, circulating heater said to serve living room, kitchen-dining room, bath, bedroom on the first floor and one unfinished room under the roof; roofing is lightest composition obtainable; exterior is clapboard, paper, number 2 sheathing, studs, ¼-inch insulating board, paint.

We confess to having only an amateur's knowledge of house construction and maybe these houses will stand up longer than we give credit for. And we freely admit that these are houses built under Chicago's wages of $1.65 per hour, up. But if we judge the satisfaction the owner will have in the house from the basis of the heating plant which we feel somewhat qualified to criticise, a good many owners are going to pass some unsatisfactory winters in this area.

We feel that there is a limit under which construction cannot be cut, not even to satisfy the nation's planners. Builders of such houses, very naturally, have to make the house attractive. Therefore money for paint, bright colored roofs, knick-nacks and gadgets inside, of known sales appeal, get first call on the building dollar. What is left over goes into the essentials, which are not sales-appealing.

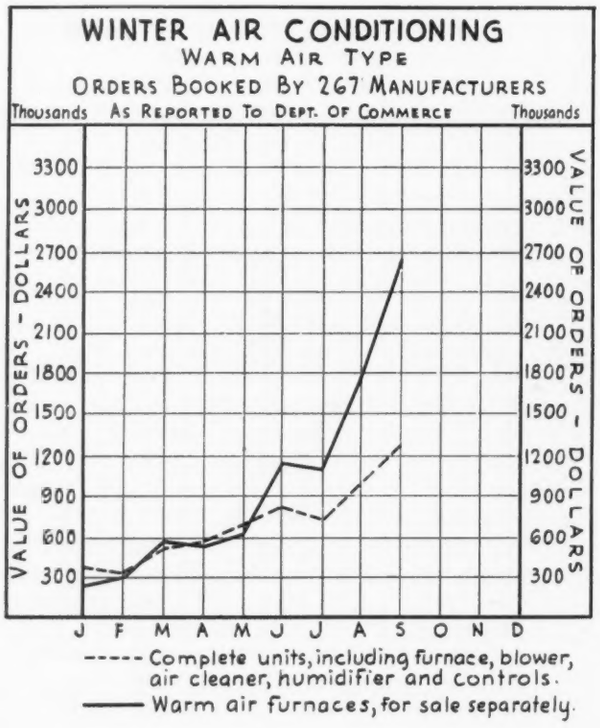
What better to do? From some little experience

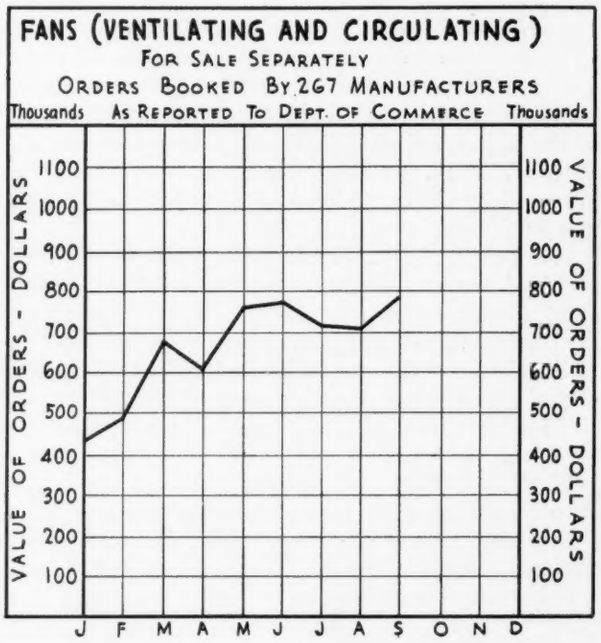
(*Continued on page* 53)

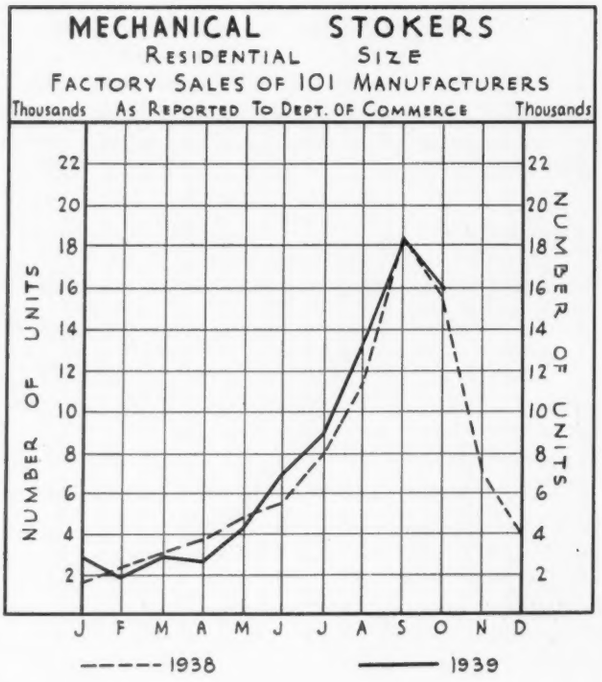
Current Business Trends

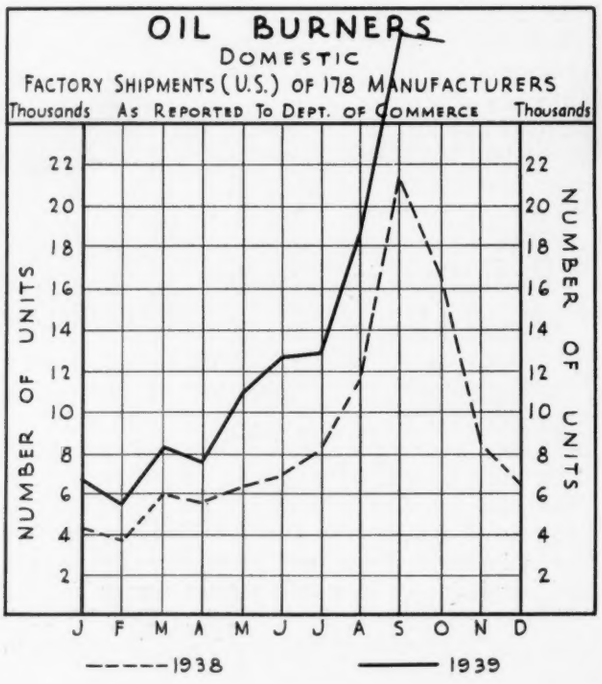
THE accompanying charts show that business in winter air conditioning, ventilating fans, stokers and oil burners . . . good indices of the industry as a whole . . . has made an excellent record in the first nine and ten months of this year. Oil burner shipments in October were 70 per cent ahead of those for October last year and, for the first ten months of this year, were 54 per cent ahead of the same period of 1938. Domestic stoker sales are 5 per cent ahead of last year and, while orders for winter air conditioning and ventilating fans can not be compared separately with those in 1938, the air conditioning field as a whole has shown a gain in the first nine months of this year of 44 per cent.

Private residential building in October was the highest since April 1937 according to F. W. Dodge Corporation. The most significant gains were made in one-family residences. The total number of dwelling units constructed during the first ten months of this year was 57 per cent over the corresponding period in 1938.


WINTER AIR CONDITIONING
WARM AIR TYPE
ORDERS BOOKED BY 267 MANUFACTURERS
Thousands AS REPORTED TO DEPT. OF COMMERCE Thousands
VALUE OF ORDERS - DOLLARS
VALUE OF ORDERS - DOLLARS
3300 3000 2700 2400 2100 1800 1500 1200 900 600 300
J F M A M J J A S O N D
----- Complete units, including furnace, blower, air cleaner, humidifier and controls.
—— Warm air furnaces, for sale separately.


FANS (VENTILATING AND CIRCULATING)
FOR SALE SEPARATELY
ORDERS BOOKED BY 267 MANUFACTURERS
Thousands AS REPORTED TO DEPT. OF COMMERCE Thousands
VALUE OF ORDERS - DOLLARS
VALUE OF ORDERS - DOLLARS
1100 1000 900 800 700 600 500 400 300 200 100
J F M A M J J A S O N D

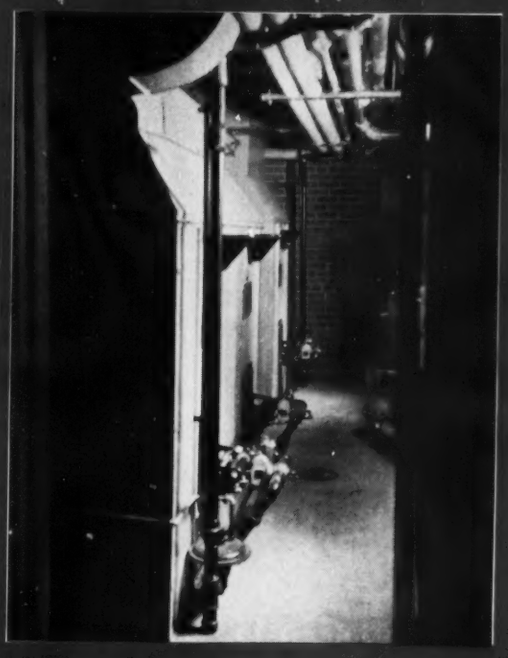

MECHANICAL STOKERS
RESIDENTIAL SIZE
FACTORY SALES OF 101 MANUFACTURERS
Thousands AS REPORTED TO DEPT. OF COMMERCE Thousands
NUMBER OF UNITS
NUMBER OF UNITS
22 20 18 16 14 12 10 8 6 4 2
J F M A M J J A S O N D
----- 1938 —— 1939


OIL BURNERS
DOMESTIC
FACTORY SHIPMENTS (U.S.) OF 178 MANUFACTURERS
Thousands AS REPORTED TO DEPT. OF COMMERCE Thousands
NUMBER OF UNITS
NUMBER OF UNITS
22 20 18 16 14 12 10 8 6 4 2
J F M A M J J A S O N D
----- 1938 —— 1939

AMERICAN ARTISAN

RESIDENTIAL AIR CONDITIONING

SECTION



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after severe tests prove their superiority

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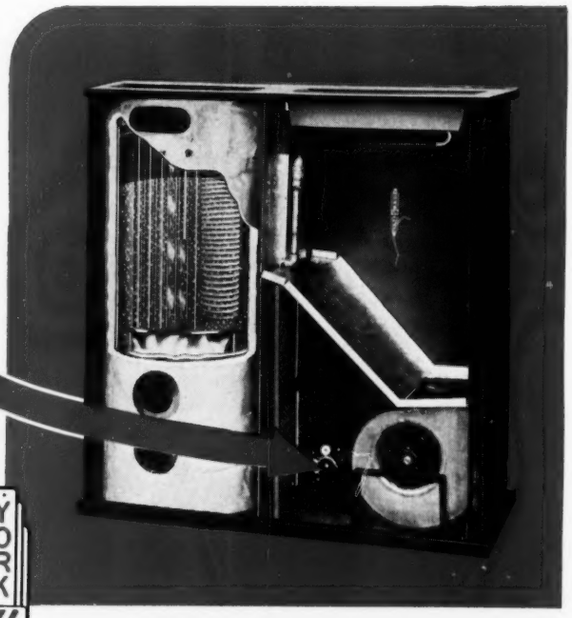
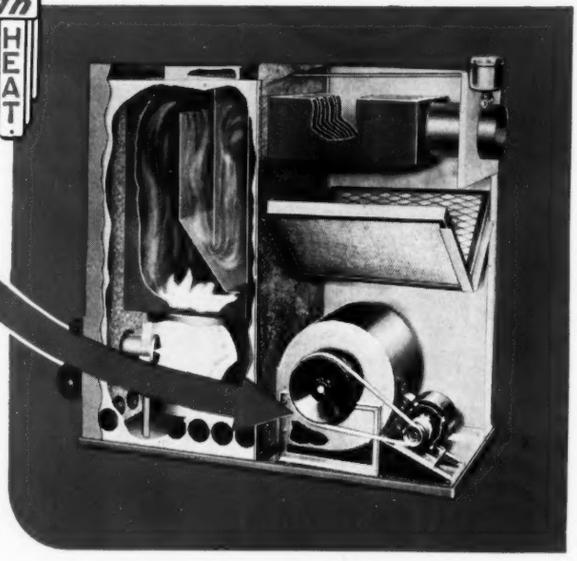


- for its complete line of FORCED WARM AIR UNITS

• Further evidence of the superior performance of VIKING Blowers is their selection, after severe competitive tests, for the complete line of YORK-HEAT Forced Warm Air Units. Quoting again from their letter, "It has been through this cooperation (by VIKING engineers) that York-Heat Units are . . so exceptionally quiet."

YORK 4h HEAT



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VIKING AIR CONDITIONING CORPORATION

Air Conditioning Facts From the Research Residence

Controls For Two Speed Fan Operation

By S. Konzo

Special Research Assistant Professor
Engineering Experiment Station
University of Illinois

AN extensive series of tests have been conducted in the Warm Air Heating Research Residence of the National Warm Air Heating and Air Conditioning Association dealing with various types of automatic control systems. Detailed reports of these investigations have been presented in the book entitled "Winter Air Conditioning—Forced Air Heating."

In the October issue, a discussion was presented of two types of control systems, which provide for continuous fan operation. In the November issue two types of automatic controls for intermittent operation of the fan were considered in some detail. In this third and concluding article on automatic controls for forced-air heating systems, the results obtained from the tests on two-speed fan operation will be presented.

Fundamentally, the primary purpose of any heating plant is to provide for a comfortable environment. Any improvement in plant operation which will increase the comfort conditions over that obtainable with any other method of operation is worthy of investigation. The two-speed fan falls in this category; it is an improvement over the control systems now in common use.

Limitations of Continuous and Intermittent Fan Operation

In the design of the duct system and in the selection of the fan for a forced-air heating system several assumptions are made which are open to close scrutiny. In the first place, the design is based on maximum load conditions, in which the outdoor temperature is within a few degrees of the minimum value attained in the given locality. Actually, over a greater part of the heating season, the heating load is not as great as this maximum load. In the second place, the selection of the duct sizes and the register sizes is based on the assumption that under this maximum load condition the fan is operating continuously. Furthermore, the assumption is made that the temperature of the warm air leaving the registers is the same as that used for design purposes. Thus, the actual plant under maximum load conditions should function properly and should provide for continuous operation of the fan.

On account of the electrical costs of fan operation, however, a majority of the fans used in forced-air heating systems are not operated continuously, but are operated intermittently. To a certain extent, whenever the fan is operated intermittently, some of the assumptions which were made when the duct sizes were determined no longer hold exactly.

When the fan is operated intermittently the heat supply to the rooms consists of an "on-period" and on "off-period." During the on-period of the fan, all the rooms are being supplied with warm air; when the fan stops, however, and the off-period begins, all of the rooms are not supplied with warm air. In the case of the Research Residence it was observed that the rooms on the second and third stories were subject to some "gravity" action during the off-periods. The rooms on the first story were not subject to "gravity" action during the off-periods, and hence when the fan was stopped, the heat input to the first floor rooms also stopped.

Temperature Variations in the Living Zone

This variation in the heat input to the rooms during the on-period and off-periods of fan operation affected the temperature variations in the living zone in the rooms. From the standpoint of bodily comfort the temperature of the air in the living zone is of particular significance. In the Research Residence tests this temperature has been considered as the average of the temperatures at the floor and at the breathing level. Now if this temperature in the living zone is maintained high enough in each room to provide comfortable conditions and if this temperature does not change with time, ideal conditions may be considered to exist. In practice, however, some rooms will be found to cool much more rapidly than others. Also, lower temperatures in the living zone will exist in some rooms than in others even though the temperatures at the breathing level are maintained the same in all of the rooms.

A typical record of room air temperatures, at the floor level, the breathing level, and the ceiling level, during a complete cycle of the on-periods and off-periods of the fan is shown in Fig. 1 for a day in which the outdoor air temperature was —8.0 deg. F. This record was obtained when the single-

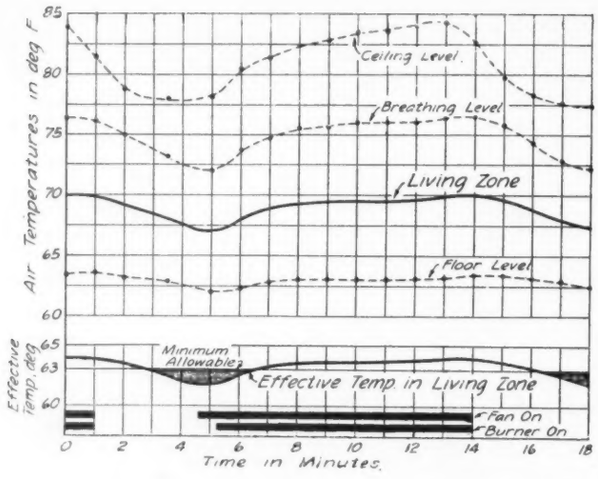


Fig. 1—Typical variations in room temperatures of living room with single-speed, intermittent fan operation. (Observations made when outdoor temperature was —8 deg. F.

speed fan was operated intermittently. During the entire cycle of temperature variation, the air at the ceiling level was warmer than that nearer the floor level. Furthermore, when the fan ceased running, the temperature of the air near the ceiling decreased more rapidly than did the temperature of the air near the floor. The temperature of the living zone is shown by the solid lines in Fig. 1.

The comfort chart of the American Society of Heating and Ventilating Engineers has established an *effective* temperature of 63 deg. as the minimum for comfort, and this value has been used as a standard for comparison in determining the comfort conditions maintained in the room. The effective temperature in the case of Fig. 1 is indicated by the bottom curve. It may be noted from the shaded section in the curve, that approximately two minutes after the circulating fan was stopped, the effective temperature in the living zone was reduced to less than 63 deg. The comfort conditions in the room cannot, therefore, be regarded as entirely satisfactory. Either a slight increase in the average living zone temperature or a more frequent operation of the fan would be sufficient to provide satisfactory operation.

This change in the living zone temperature during the on-periods and off-periods of the fan was about three times as large on the first story rooms than it was on the rooms on the second and the third stories, as shown in Table 1.

TABLE 1

Change in Living Zone Temperature During On-Periods and Off-Periods of Fan

Story	Average change in temperature, deg. F.
First	2.7
Second	0.8
Third	0.8

Note: Measurements made when the outdoor temperature was approximately minus 6 deg. F.

Several corrective measures may be suggested, as follows:

a) In the case of an isolated room, or a room having excessive heat losses, it is important that the losses be minimized. Improvements in house construction reduce the cooling rate of the room when the fan is stopped and also decrease the temperature differential from ceiling to floor.

b) It is common practice to use zone controls.

c) It is good practice to maintain slightly higher air temperatures in isolated rooms.

d) It is essential that the temperature difference from breathing level to floor be made as small as possible.

e) Since the discomfort conditions follow each off-period of the fan, any control which will reduce both the number and the length of the off-periods will be more satisfactory.

The use of the two-speed fan was found to be most effective in reducing the number and length of off-periods, as will be shown in the following discussion.

Performance of Two-Speed Fan

In the tests made with a single-speed fan the air delivery was maintained at 1,675 c.f.m. In the tests made with the two-speed fan the same high speed was retained so that an air delivery of 1,675 c.f.m. was obtained, and a low speed was selected such that an air delivery of 1,000 c.f.m. was obtained. In this particular installation it was not possible to obtain a lower fan speed and hence a lower air delivery. It is of interest to note that this air delivery at low-speed, amounting to 1,000 c.f.m or approximately 60 per cent of the delivery at high speed, was materially higher than the normal air deliveries obtained with the gravity warm-air furnace in the Research Residence. In the latter installation, air deliveries ranging from approximately 500 c.f.m. to 800 c.f.m. were reported.

In the case of the tests with the single-speed fan operated intermittently, the control of the heating plant was accomplished by means of a room thermostat operating to start and to stop the combustion process and the circulating fan as shown in Fig. 2. This room thermostat was used in conjunction with two bonnet thermostats, one of which served to stop the fan when the bonnet air tempera-

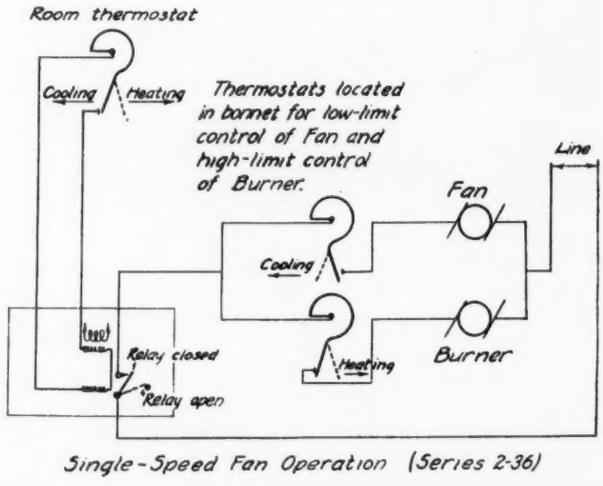


Fig. 2—Simplified wiring diagram for single-speed fan operation.

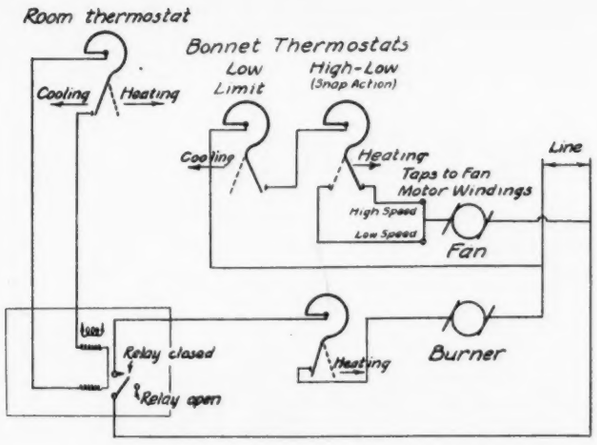


Fig. 3—Simplified wiring diagram for two-speed fan Operation.

ture became less than 125 deg. F, and the other of which served to stop the burner when the bonnet air temperature became greater than 175 deg. F.

In the case of the tests made with the two-speed fan the room thermostat was not changed, but modifications were made in the electrical connections for the bonnet thermostats and also in the settings of the bonnet thermostats. The control of the heating plant was accomplished by means of the room thermostat operating to start and stop the combustion process only as shown in Fig. 3. When the bonnet air temperature was less than 125 deg. F, the fan did not operate; when the bonnet air temperature was between 125 deg. F and 160 deg. F, the fan was operated at low speed; and when the bonnet air temperature exceeded 160 deg. F, the fan was operated at high speed. In both series of tests the same control instruments were used in order to eliminate any effects due to differences in the sensitivity and setting of the instruments; and the same electric motor (½ hp capacitor type, 110 volts, 60 cycle, 1,140 rpm maximum speed) was used for the fan in order to eliminate effects due to differences in motor characteristics.

The selection of 1,000 c.f.m. delivery for low speed operation of the two-speed fan was quite arbitrary, and the results obtained would have been modified slightly if a delivery either greater or less than this had been used. Also the relative power costs for a two-speed fan motor and a single-speed fan motor would be dependent on the special characteristics of the motor used.

A. Fuel Consumption

The operating conditions which were maintained for the oil burner and the oil-burning furnace were identical in the two series of tests. The oil input rate was approximately 13 lb. per hour, the air supply to the burner was adjusted to maintain 9.5 per cent of CO_2 in the flue gas, and the draft in the combustion chamber was maintained at 0.02 in. of water gage.

For milder weather conditions, or for indoor-

(*Continued on page* 80)

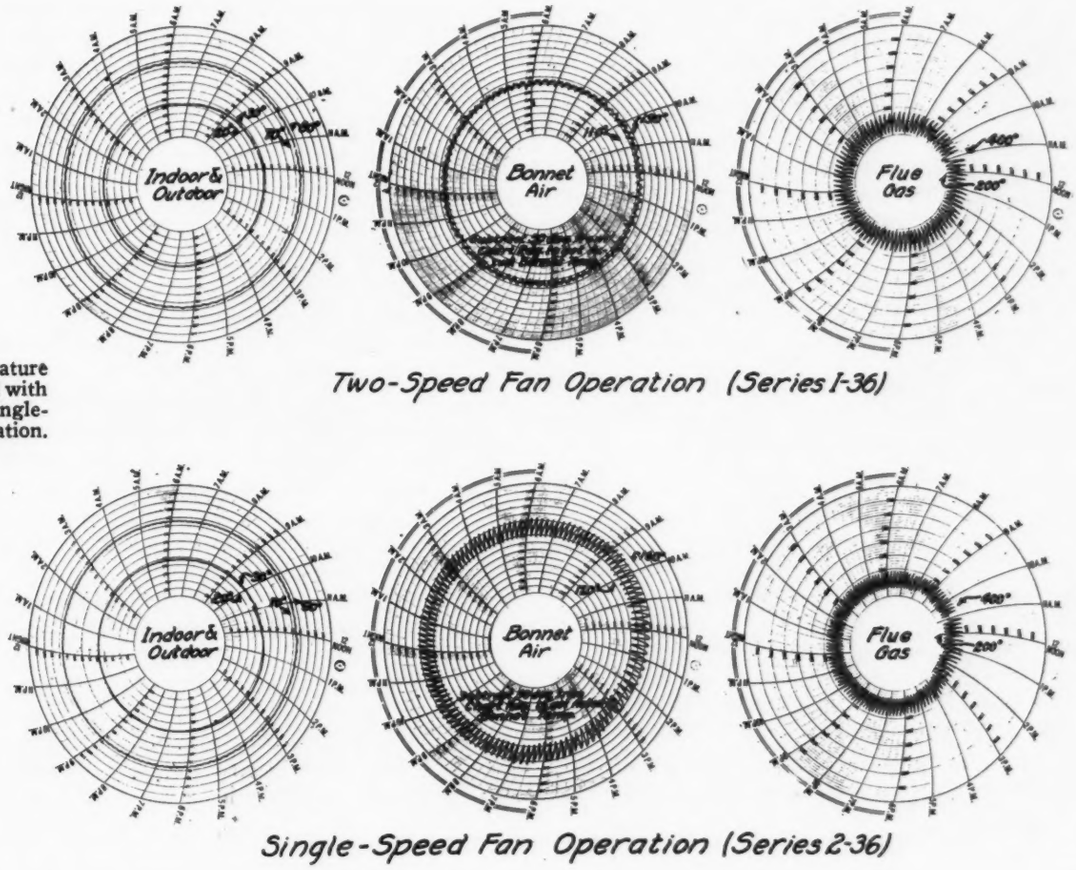


Fig. 4—Temperature records obtained with two-speed and single-speed fan operation.

Pattern Development for

Air Conditioning Fittings*

By William Neubecker
Head Instructor
Sheet Metal Department, New York Trade School

Round Pipe "Y" From Rectangular Main

IN the previous problem the method of developing the pattern for a splitter type of round pipe Y-branch was shown. In the following demonstration a different type of Y is shown in Fig. 40. Here two prongs lead at angles of 60 degrees (or any other given angle) and are taken off the rectangular main. In this case the size of the main or feed duct is 8x9 inches with an 8-inch depth and with two 6¾ inch round branches similar in dimensions given in the previous problem.

The letter T in plan indicates the intersection of the two prongs or branches at their inner angle, where a damper plate can be inserted if desired. Note that the connection of these two branches with the rectangular duct are made by means of a flat triangular surface indicated by *a-b-T*, the branches joining to the lines *a-T* and *T-b* as shown. When developing the one-half pattern shape for one branch, a seam will be made along *b-c*, *d-T* and *T-R*.

Simplified Method of Triangulation

Fig. 41 shows the simplified method of applying triangulation to the development of this problem. Draw any horizontal line as *A-C* to represent the center line between the two branches of the *Y*. From *C* draw the desired angle at 60 degrees as shown from *C* to *4°* to the desired length. At right angles to *C-4°* draw a line through *4°* and make *4°-1* and *4°-7* each equal to one half of the desired diameter of the round pipe. Draw a line from *B* to *7* and find the angle *A-1* as follows: At right angles to *C-4°* draw a line from *C* and intersect it at *b* by an arc struck from *C* as center, with *C-a* as radius as shown. Now draw a line from *b* to 1 intersecting the center line *C-A* at *A*. This makes the angle *A-1-7* equal to the angle *B-7-1* on the opposite side. Draw a line from *A* to *B*. Opposite to the center line *A-C* a broken view of the opposite transition branch is shown, which is not necessary in the development of the half pattern shape.

C-A-1-7-B-C then represents the one half plan of one branch of the Y. Extend *B-C* in the half branch, making *C-a* equal to *C-B*. In line and at right angles to *a-B* draw the *half* section of the main duct 4 x 9 inches as shown. Now at right angles to *A-B* in the half plan draw the lines *A-A°* and *B-B°* equal to the half depth of the duct or 4 inches and draw a line from *A°* to *B°*. Then will *A-A°-B°-B* represent the half section of the rectangular duct on the line *A-B*. Using *4°* as center with *4°-1* or *7* as radius draw the semi-circle *1-4-7*, which divide in equal divisions as shown by the small figures 1 to *7*. From these divisions draw lines at right angles to *1-7* to intersect the line *1-7* from *2°* to *6°*. From points *2°-3°* and *4°* draw lines to the corner *A* and from points *4°-5°* and *6°* draw lines to the corner *B*.

These solid and dotted lines in the half plan, represent the bases of triangles to be constructed whose altitudes will be equal to the heights shown in the half rectangular and semi-circular sections. Now to find the true lengths of the lines shown in *A-1-4°* in the half plan, draw any right angle *A-A°-4°* in the true length diagram at the right and make the distance *A-A°* equal to *A-A°* in the half rectangular section in the half plan. Measuring from *A* in the half plan, take the various distances to points 1, *2*, *3* and *4* and set them off in the true lengths, measuring from the corner *A°*, thus obtaining the points 1, *2°*, *3°* and *4°*.

Measuring in each instance from the line *1-7* in the half plan, take the various distances to points *2*, *3*, and *4* in the semi-circle and set them off on the perpendicular lines erected from similar numbers in the true lengths and obtain the points marked *2*, *3* and *4* from which points lines are drawn to *A*, representing the true lengths of similar numbered lines in half plan.

In a similar manner find the true lengths of the lines in *B-7-4°* in half plan. Draw any right angle *B-B°-4°* in the true lengths. Make the distance *B-B°* equal to *B-B°* in the half rectangular section in half plan or 4 inches. Take the length of the lines in half plan, from *B* to *4°*, *5°*, *6°* and *7* and set them off from *B°* in the true lengths as shown by similar numbers marked *4°*, *5°*, *6°* and *7*.

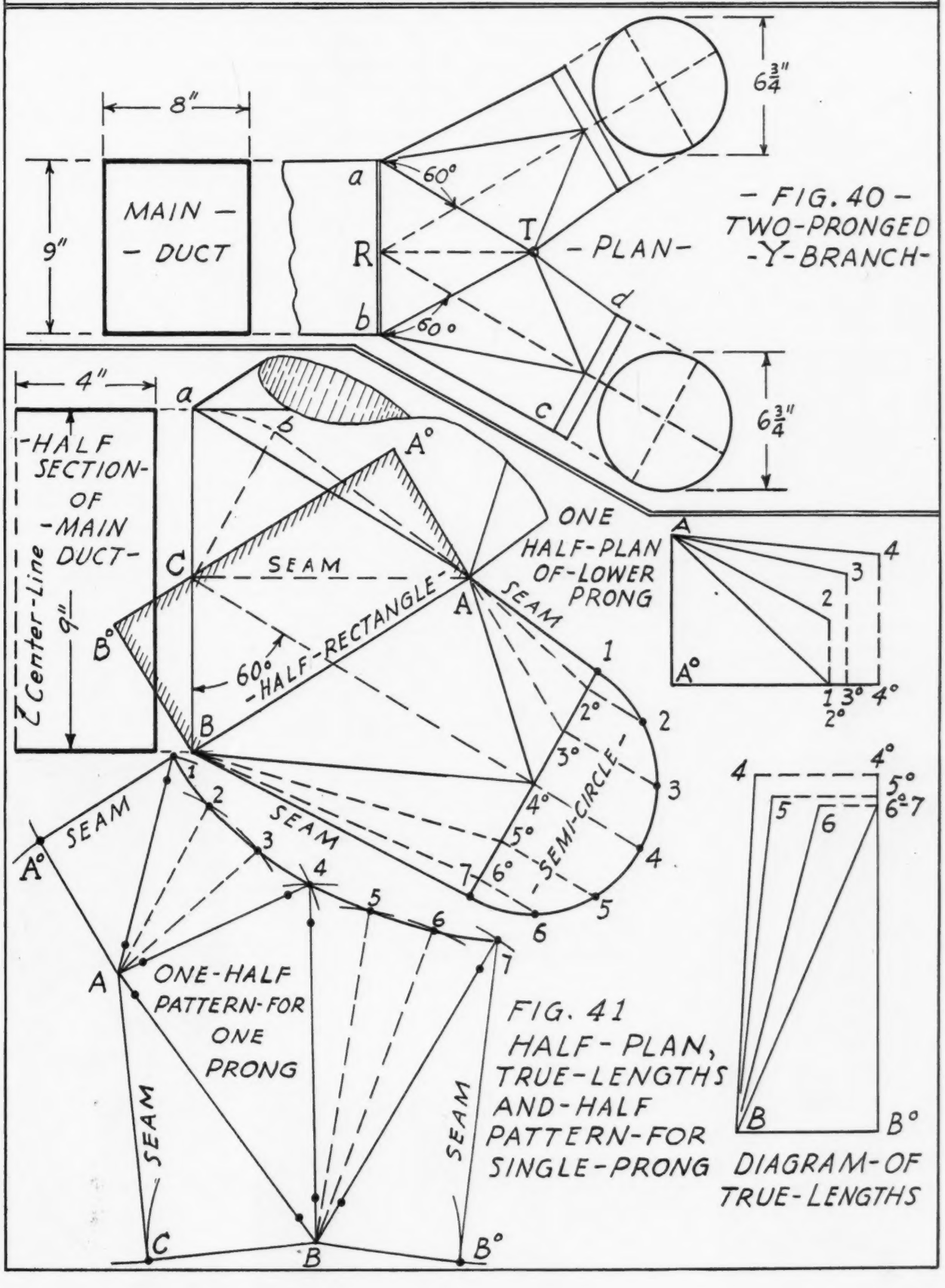
From these points draw lines at right angles to *4°-B°* and make *4°-4*, *5°-5* and *6°-6* equal to similar numbers in the semi-circle in half plan measuring in each instance from the line *1-7*. Lines drawn from *4*, *5* and *6* in the true lengths, to *B*, will be the true lengths of similar numbered lines in half plan.

The half pattern can now be laid out. Take the length of *A-B* in half plan which shows its true length

(*Continued on page* 59)

*All rights reserved.

PATTERN FOR ROUND PIPE -Y-BRANCH TAKEN OFF END OF RECTANGULAR MAIN OF EQUAL AREA USING SIMPLIFIED TRIANGULATION IN ITS DEVELOPMENT-



High Side-Wall vs. Base Board Registers

You probably have your preference. But, like most other "favorites," the final "odds" can only be posted when all the conditions of the contest are summarized. Here is a case where high side-wall registers "looked good" until the job actually operated. Then conditions were so unsatisfactory that the owner had to adopt baseboard locations to keep his apartments occupied. The author, therefore, considers high side-wall registers fraught with danger.

By B. L. Schwartz

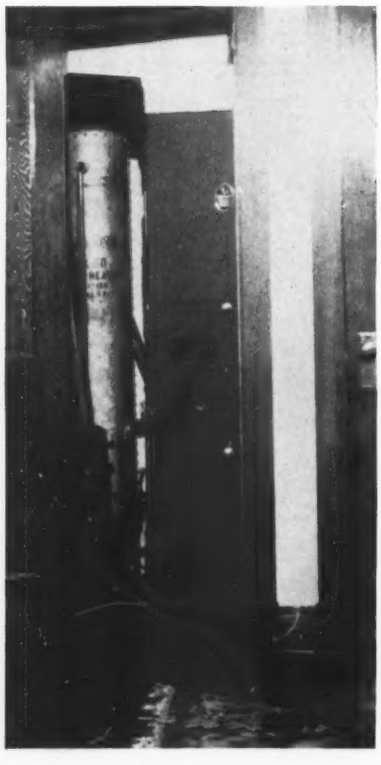
Pittsburgh, Penna.

LIKE the story of the three little fishes, the transformation of three little garages into three separate apartments was followed by results unlooked for by the builders. And just like the famous song, correction of the unlooked-for developments made everything turn out O. K.

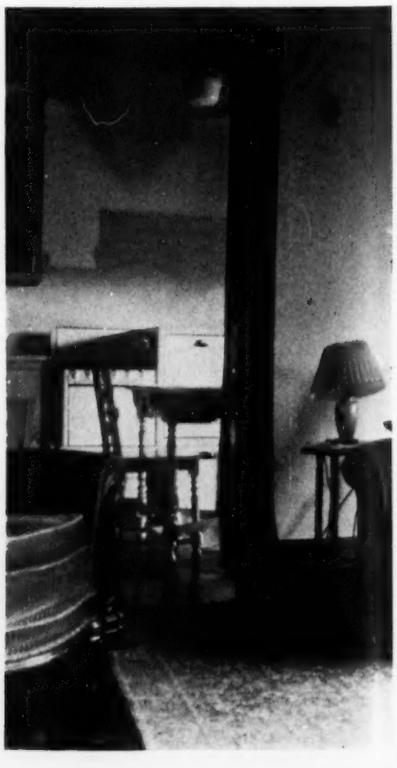
These jobs are located on McCutcheon Lane in Penn Township; just outside of Pittsburgh. Originally just three, ordinary, separate garages under one roof, the owners decided to convert them into three modern apartments. The building is located in the side of a hill directly off the street level. There is no basement and all the apartments are on the same street level under one common roof. Each apartment consists of three rooms and bath. Laundry facilities are taken care of in a separate building erected for that purpose adjacent to the apartment building.

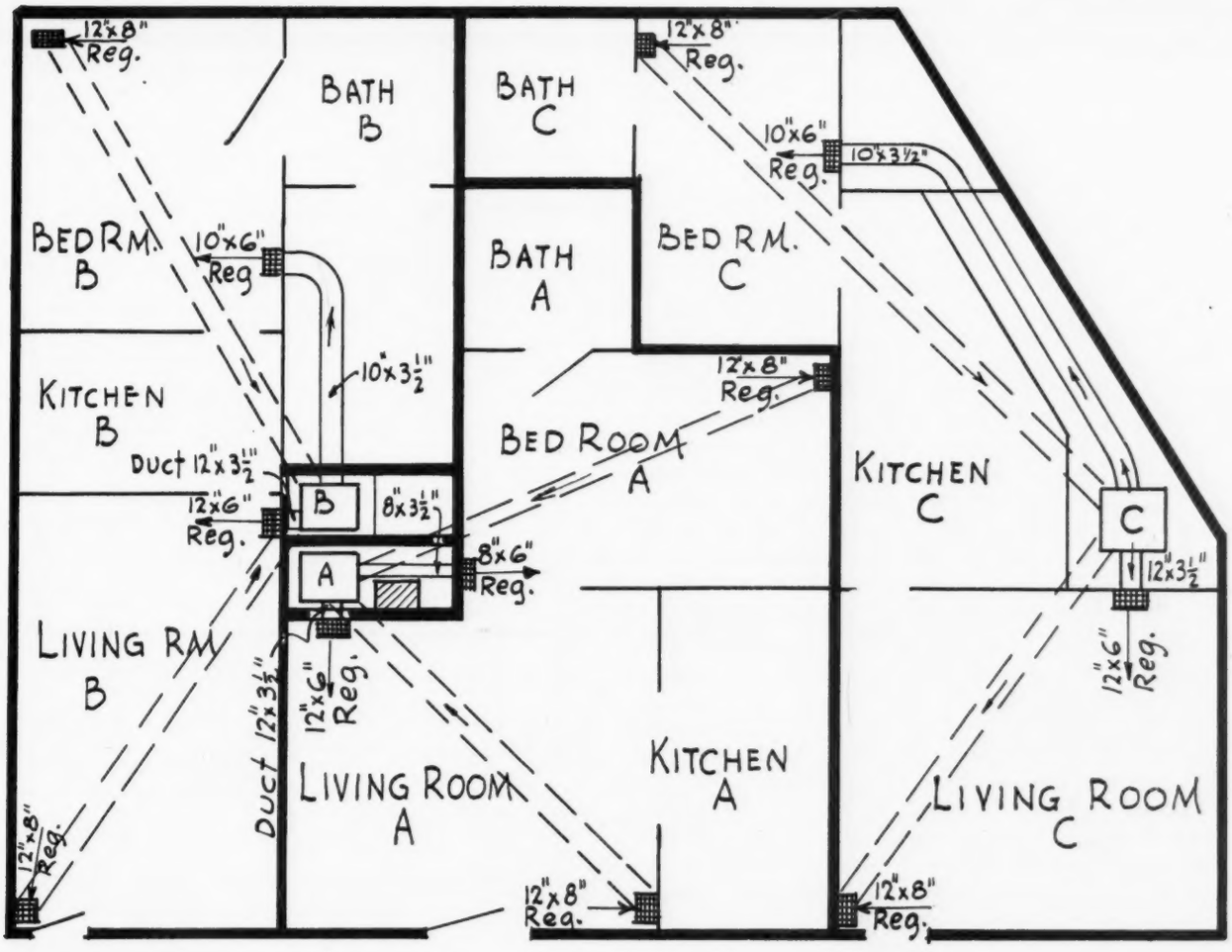
The original outer walls and roof were retained with practically no change. New floors were laid and inner partitions erected to separate the apartments from each other. The balance of the construction followed customary building procedure and, as a result, three very attractive apartments were created. Completely equipped with all utilities (gas, water and electricity) and moderately priced for rental purposes, the apartments were all rented even before completion.

The heating problem was analysed and a decision reached to install separate, vertical type heaters for each apartment. These units were to be gas fired and were installed in small utility closets which also housed the hot water heater for each apartment. A system of overhead ducts, terminating in base registers for each room was designed; with two floor returns for each apartment. The grilles were located in the living room and bedroom respectively for each apartment; no returns being



Below are photographs of the exterior of the remodeled garage; one of the gas-fired furnaces in its closet; the first location of the thermostat, above breathing level. On the facing page is the floor plan layout of the three apartments showing original location of baseboard registers which were changed to high side-wall registers and then changed back when cold floors kept the apartments empty.





taken from the kitchen or bathroom. The two returns from each apartment were run in sewer pipe under the floor to a concrete trench located directly under each heater. The return lines and concrete pits were laid before the floor was put in place.

Combustion air for each heater is provided through a grille in the lower half of the door opening into the utility closet. In one apartment this door leads directly from the living room; in the others, from the bedroom and kitchen respectively. The thermostats controlling the heaters are located in the living rooms of each apartment. One of the photographs shows how high above the floor the thermostats were placed.

Equipment and Operation

Three Bryant VB-8 automatic gas heaters were chosen for these jobs. Each unit has an input rating of 75,000 B.t.u.'s per hour and has a built-in blower assembly consisting of a 10-inch diameter, squirrel-cage type wheel driven by a ¼ H.P. motor. The heaters are A.G.A. approved and are equipped with safety pilots and limit or overheating controls. The floor space required by each heater measures less than four square feet (22"x22"); and thus lends itself very nicely to a compact installation. The entire assembly is completely enclosed and comes as a factory package.

Operation of each unit is entirely automatic. When the thermostat calls for heat, the gas comes on and generates heat for delivery to the warm air plenum top. When the bonnet temperature reaches 135 degrees, the blower switch automatically kicks in and forced air circulation begins. A built-in differential of 12 to 15 degrees in the blower control shuts the motor off when the bonnet temperature drops to 120 degrees after the gas shuts off (thermostat satisfied). Such an arrangement prevents air circulation without heat.

The original installations were not made in accordance with the writer's recommendations. The supply outlets were placed in the side walls about twelve inches from the ceiling; instead of in the base as designed. The thermostats were installed on the same walls within a few feet of the heat outlets; and were placed six feet from the floor.

Tenants Complained of Cold Floors

Once the heating systems were started, the trouble began. The heaters worked all right, but the heat accumulated in the upper strata of the rooms and the temperature differential from floor to ceiling was so great as to make living conditions unbearable. The thermostat location was such that it was necessary to set the dial at 85 degrees in order to attain an approximate 70 degrees two or three feet from the floor. And it wasn't long before the ceilings were badly streaked in a direct line

with each warm air outlet. The net result was an alarming turnover of tenant occupancy.

Baseboard Registers Cured Troubles

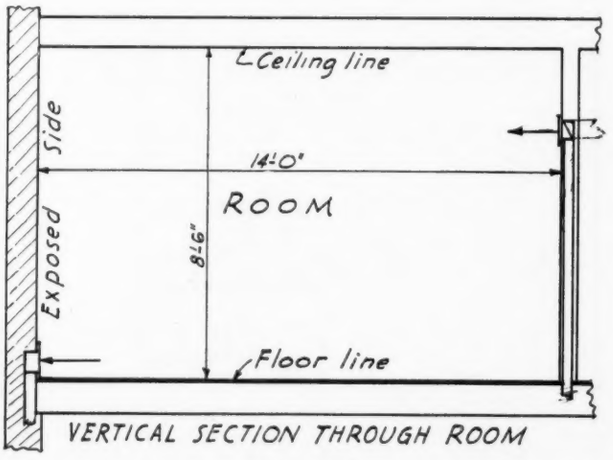
An investigation indicated the cause for the trouble that was being experienced. We recommended lowering the heat outlets to the baseboard level and also relocated the thermostats to within 4 ft. 6 in. of the floor. These changes were made in February, 1939. The heating results that followed throughout the balance of the winter were so satisfactory that no further changes in tenant personnel resulted and the owners now have a waiting list for the first vacancies that may occur.

The writer's experience with discharge air from supply (heat) registers indicates that the maximum noticeable air throw is approximately two feet horizontally for each 100 feet per minute discharge velocity. Thus a register delivery of say 300 feet per minute linear velocity as measured with an anemometer at the register face, will barely turn the wheel six feet away from it. This condition is a natural result of the cushioning effect of the room air; as is the case when a stream of water enters a pond or lake.

In consideration of the above, it would be necessary to maintain a discharge velocity of more than 1000 feet per minute in order to carry the supply air across the room as illustrated. And if the return grille is located on the inside partition below the supply register, the required velocity will have to exceed 1500 feet per minute. Duct velocities would be proportionately greater. Such velocities are out of reason and are not in accordance with good practice in residential work. Some of the ill effects of such operation would result in unduly high air motion, noise, increased resistance to air flow resulting in higher motive power requirements and costs, etc. Lower velocities do not have sufficient "carry" to move the air to the points where it will do the job required.

Some Limitations of High Wall Registers

The above analysis explains, the writer believes, the failure of high side wall registers to do the job of heating required of a winter forced air plant. An installation of this sort is satisfactory for a cooling or summer job; but it will not do for winter heating jobs. Moreover, heating is a 7 to 8 months' proposition; whereas cooling is just a couple of months each year. Installations of forced air plants in the Pittsburgh belt are almost entirely winter heating jobs; with no further cooling equipment than the blower for air circulation in summer.



The required air "carry" in the largest room is about 14 feet. To get the volume of air required to sweep the opposite wall required a register velocity of 1,000 fpm. This would have meant impossible velocities throughout the system.

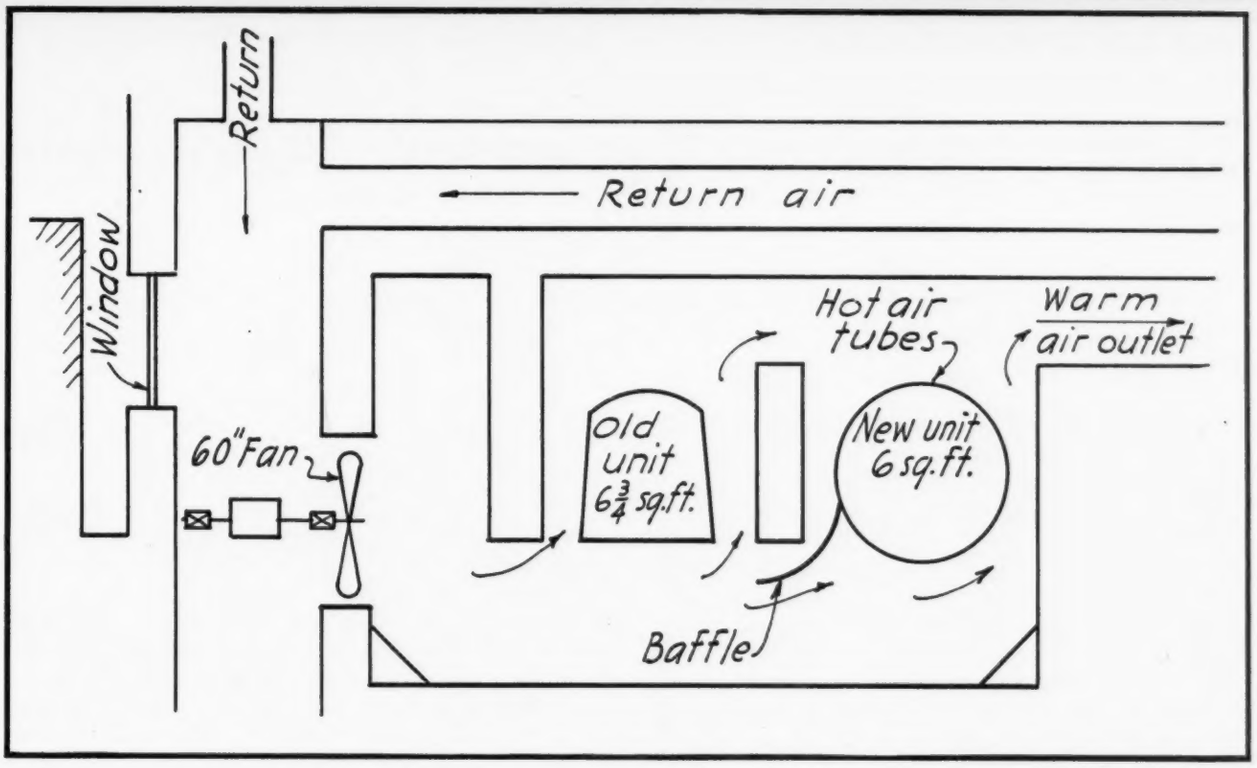
To those men involved in this heating field who have had more or less experience along these lines, there is nothing new or startling in this story. It does emphasize the need for proper engineering and installation practice. The writer has in mind new entries in the heating and air conditioning field who might well investigate the practices being recommended by their sales representatives and engineers. Side wall heat outlets placed from 9 to 12 inches from the ceiling, combined with high velocity air, seems a dangerous setup to play with. The experience of several of our better heating contractors who started out with high side wall register installation practice and who have, one by one, returned to baseboard installations, is in itself worthy of consideration.

Research Residence Has Been Insulated

The famous "research residence" erected by the National Warm Air Heating and Air Conditioning Association at the University of Illinois has now been scientifically insulated. A six-inch layer of mineral wool has been "blown" into the sidewall and ceiling spaces. This paves the way for a new and important series of experiments by which University of Illinois engineers will uncover facts regarding the best methods of maintaining comfort in the American home.

The actual work of insulating the three-story frame house was performed by the National Mineral Wool Association as a contribution to the common cause of scientific research.

"The typical American home of the future," the research advisory committee believes, "is going to be pretty thoroughly insulated. The research residence was originally designed and built, and has always been maintained, to be as nearly typical of good average American residential practice as was possible. Only in this way could the data derived from tests and experiments carried on in it be useful for the largest number of other American homes.



Purdue Heating Class Inspects a Trouble Job

By James E. Hammer

THE board of directors of the West Lafayette Methodist Church, Lafayette, Ind., complained that the building was drafty, dusty, and that it could not be heated completely.

Professor W. T. Miller, of the Purdue University Heating and Ventilating Department, was informed of the complaint and obligingly had his class of mechanical engineering seniors inspect the church layout and heating plant.

The class found the church to be heated by a forced fan (propeller) system with two heating units shown at the top of the page.

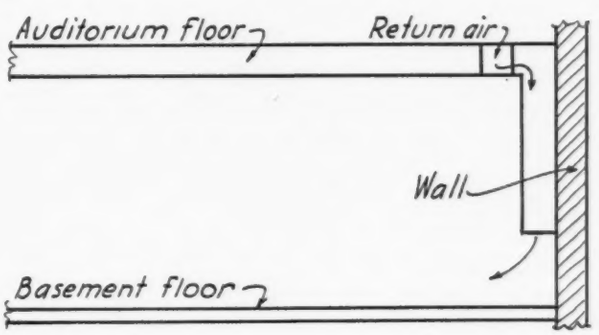
The baffle shown between the two units is not adjustable and the class decided that an adjustable baffle would be necessary to eliminate the short-circuiting of air across the new unit to be concentrated on the old. This would improve the operating efficiency considerably.

By measurement, it was found that there was plenty of warm air being delivered, but very little of the air from the auditorium was returned for reheating. By closer inspection it was found that the return ducts leading from the rear of the auditorium are so placed between converging rafters that no air could be returned due to the great resistance created.

As the church was low on funds for completely rebuilding the ducts the solution of the class was to spill the return air through the auditorium floor, to the basement floor, and allow it to reach the furnace air intake with relatively little resistance. A sketch of this solution is shown below.

The church is built with a door opening into rear corners of the auditorium. The opening of both of these doors undoubtedly causes the excessive draft in the complaint. This is inherent in the construction of the church and the only solution the class could find was to keep one door closed, using only one as an entrance. The rather cryptic observation was made that the size of the congregation warranted only one door.

No filters were to be found in the system, therefore the complaint of dust. However, if filters were installed the resistance created by them would be very hard for the 60-inch propeller type fan now in use to overcome. The solution to the dust problem, if financially possible, would be to install filters and also a blower which would easily overcome the resistance. This would also eliminate the reentry air which is prevalent with the propeller type fan.



Building Insulation; Types and Applications

Paper delivered by S. Konzo at the Second Air Conditioning Conference, University of Illinois; Urbana, Illinois, March 8 and 9, 1939. This is Part 3; Part 2 appeared in the November issue.

Surface Temperatures of Concrete Floors

CONCRETE floors laid directly on the ground without an intervening air space transmit heat readily through the floor with the result that the upper surface temperature of the floor is within a few degrees of the ground temperature. The calculations shown in Appendix Section (k) indicate that for a ground temperature of 50 deg. F. the upper surface temperature of a 4 in. concrete slab will be 55.3 deg. F. Floor surface temperatures of such values may be decidedly undesirable in much-used living quarters. Conditions can be improved as shown in Fig. 10 by providing a layer of cinder concrete below the concrete floor, by adding some form of rigid insulation between the cinder concrete and stone concrete, or by placing on top of the concrete slab a wood flooring.

Insulation Effect Under Summer Conditions

Experimental data on the effectiveness of varying amounts of insulation in reducing the flow of heat from the outdoors to indoors under summer conditions are meager. In fact, on account of the cyclical nature of the temperature variation of the outdoor air, the effects of heat storage, the effects of solar radiation, and thermal lag, the problem is a most complicated one. The following discussion based upon calculated values obtained from tests conducted in the Research Residence, therefore, should be considered as indicative of the general tendency rather than of specific results.

The calculated values of the ten component items of the cooling load in Table 4 (November) were reproduced from Engineering Experiment Station Bulletin 305. "In this particular case practically one-quarter of the calculated cooling load may be attributed to the heat transmission through the walls which were not exposed to the sun (Item 1), and approximately one-tenth to the heat transmission through walls which were exposed to the sun (Item 2). That is, approximately one-third of the total load may be attributed to the heat transmission through the walls alone. . . . . The amount of heat transmitted through the ceiling (Item 5) is exceedingly large, due not only to the relatively high coefficient of heat transmission, but also to the very large temperature difference that exists between the attic space and the indoor air."

As shown in Appendix Section (1) if by the addition of approximately 2 in. of fill insulation the overall coefficient, U, of heat transmission for both wall and ceiling could be reduced to 0.1 B.t.u. per hr. per sq. ft. per deg. F., the calculated heat gain of the house could be reduced from 37,360 B.t.u. per hr. to 24,165 B.t.u. per hr., or a reduction amounting to 35.3 per cent.

In addition, as indicated from unpublished data obtained during tests conducted in the summer of 1938, the time lag for the passage of heat through the walls would be increased, so that the cooling load would be distributed more uniformly with respect to the time of day. Also these tests made under actual service conditions have indicated that the inner surface temperature of the walls facing the occupant did not attain as high a temperature when the walls were well insulated as when no insulation was used. Under summer conditions the maintenance of cooler wall surfaces will result in more comfortable conditions indoors, since less heat will be radiated from the wall surfaces to the occupant. Hence from the standpoint of the reduction

Appendix—Equations of Heat Transmission

(k) Surface Temperatures of Concrete Slab Floors on Ground.— A four-inch concrete slab placed directly on the ground conducts heat quite readily. The overall coefficient of heat transmission from room air to lower slab surface is

$$U_t = \frac{1}{\frac{1}{1.65} + \frac{4}{12.0}} = \frac{1}{0.939} = 1.065$$

For the general case, the equations of heat transmission are

$$H = U_t(65 - t_g) = 1.65(65 - t_s)$$

in which

65 is the air temperature above floor,

t_g is the ground temperature adjacent to concrete slab,

1.65 is the film coefficient on upper surface, and

t_s is the upper surface temperature of the concrete slab.

The equation simplies to

$$t_s = 65 - \frac{U_t(65 - t_g)}{1.65}$$

When $t_g = 50.0$ deg. F. and $U_t = 1.065$, $t_s = 55.3$ deg. F. (See Fig. 10.)

(L) Reduction in Calculated Cooling Load (Based on Research Residence Data*)

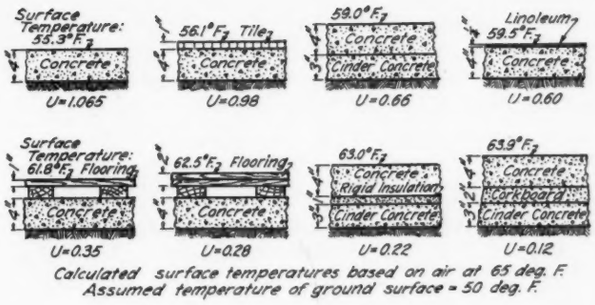
It is assumed that insulation could be applied on walls and ceiling, and that the U values could be reduced to 0.1 B.t.u. per hr. per sq. ft. per deg. F.

	Uninsulated Case		Assumed Insulated Case	
	U	H	U	H
Frame	0.25	7627	0.10	3050
Chimney	0.24	657	....	657
Partition	0.34	796	....	796
Frame	0.25	3460	0.10	1384
Ceilings	0.24	2695	0.10	1123
Ceilings	0.62	5370	0.10	866
Ceilings	0.19	985	0.10	519
Sub total		21 590		8 395
Remaining items		15 770		15 770
Total		37 360 B.t.u. per hr.		24 165 B.t.u. per hr.

Reduction in cooling load

$$= \frac{37\,360 - 24\,165}{37\,360} \times 100 = \frac{13\,195}{37\,360} \times 100 = 35.3 \text{ per cent.}$$

*Univ. of Ill. Eng. Exp. Sta. Bul. 305, pp. 80-85.



Calculated surface temperatures based on air at 65 deg. F.
Assumed temperature of ground surface = 50 deg. F.

of heat gain, and from the probable increase in comfort resulting from cooler rooms and cooler wall surfaces, the use of adequate amounts of insulation in the wall and ceiling should be given serious consideration. Furthermore, as indicated by the example showing the reduction in the calculated cooling load, the use of artificial means of cooling may under certain conditions become economically feasible to the home-owner.

Summary

(1) The relative effectiveness of two types of insulations should be based on a comparison of the conductance of heat transmitted through the *actual* thickness of material as installed. Conductivity values based on an inch thickness may be misleading when two thicknesses of insulation are under consideration.

(2) The actual reduction in the heat loss effected by adding insulation to a wall or ceiling can be determined only from the overall coefficient of heat transmission for the entire wall or ceiling.

(3) An arbitrary classification of heat barriers has been suggested, as follows:

	Overall U Value
Excellent heat barrier	0.1 B.t.u. or less
Good heat barrier	From 0.1 to 0.2 B.t.u.
Fair heat barrier	From 0.2 to 0.3 B.t.u.
Poor heat barrier	Over 0.30 B.t.u.

(4) The minimum thickness of insulation required for adequate protection (U value equal to 0.1 B.t.u. or less) of a typical wall or ceiling is approximately 2 in.

(5) Two curtains of metallic foil insulation placed ¾ in. apart in an air space give an insulating effect equivalent to approximately 1.8 in. of fill insulation.

(6) In calculating the heat transmitted through the ceiling it is suggested that either of the following two methods be used:

(a) Heat transmitted through ceiling alone

$$H_c = \text{Area}_c \times U_{\text{ceiling}} \times (t_{\text{in}} - t_{\text{attic}})$$

in which t_{attic} can be estimated from Table 5 (Nov.)

(b) Heat transmitted through ceiling and roof structure

$$H_c = \text{Area}_c \times U_{\text{com}} \times (t_{\text{in}} - t_{\text{out}})$$

in which U_{com} can be determined from Fig. 9 (Nov.)

(7) Unless the attic space is to be used for living quarters, insulation should be applied to the ceiling joists rather than to the roof rafters.

(8) If a choice exists between insulating the walls or the ceiling, the latter should be selected since the returns are greatest in proportion to the investment required.

(9) "It should be recognized that the return on the investment, whether that investment consists of storm sash, insulation, or any other fuel-saving device, depends not only on such factors as the cost of fuel, the cost of the heating equipment, and the severity of the weather, but also on whether the conservation measure is planned before the house is built or is adopted at a later date. In fact, the greatest returns on the investment are obtained when the conservation measures are planned before the house is built, and the cost of the investment is partially offset by the decrease in cost of the heating equipment of the house."

(10) The application of adequate insulation to a wall or ceiling will result in an increase in the surface temperature of the wall or ceiling, and hence will result in more comfortable conditions in the room.

(11) Concrete floors placed directly on the ground are characterized by low surface temperatures. Such floors in much-used living quarters should be so constructed or protected that the heat transmission through the floor is diminished.

(12) The application of adequate amounts of insulation to reduce the heat gain through the walls and ceiling under summer conditions should be given serious consideration by the home-owner.

Silk Thread Will Show Air Flow From Register

VERY often the heating contractor wishes to study the path of the air issuing from registers. Here is one easy way of tracing the flow. In order to use this method you need to have the room and the house generally in about the condition in which it will be on the typical winter's day; and, of course, a fire in the furnace.

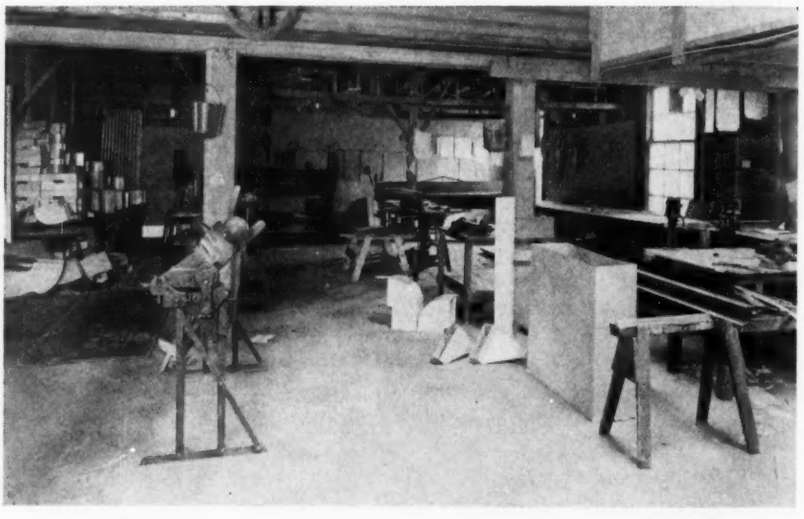
Take two yards of very fine silk thread; tie one end to the exact middle of the register and let the thread float free on the air. It will trace out the course of the current of air from the register. If you wish to follow the course of the air even beyond the indication given by the thread, fill a balloon with tabocco smoke, and let it escape, gently, at the point marked by the end of the thread. This will show where the air goes, and how fast it goes, practically throughout its entire circulation in the room.

If the thread blows directly upward from the register, you have the wrong kind of circulation for comfort. The ideal arrangement is one that sends the air current out almost horizontally from a low register, or quite sharply downward from a high one. In other words, the air currents should swirl around the room, gradually ascending, so as to break up any stagnant pools of cool or cold air, and keep the room "alive."

The photographs accompanying this report show the attractive exterior and show room, the sheet metal shop and a typical oil-fired installation of this contractor. Beginning with no experience, this contractor quickly established himself on what the industry has come to believe is a sound operating basis.

By R. C. Nason

Sales, Service and Engineering Organization of a Long Island Contractor



BELIEVING in the superior opportunities to be found in air conditioning in the suburbs of New York City, the Nassau Air Conditioning Co., Port Washington, L. I., largely deserted plumbing two years ago, installed a well equipped sheet metal shop and became one of the outstanding warm air heating dealers of "The Island." Their 100th air conditioning job for two years' operation completed, this contractor continues to employ 17 mechanics on oil-fired furnaces and conversion burner work, with no let up in sight.

No "Cheap" Quotations

Meeting price competition is not regarded of importance with this organization because only the better types of dwellings and builders are canvassed. Elmer J. Palmateer, manager, purposely avoids "cheap" work, for he has found that profit lies not here. Of the installations his company has made, the minimum property valuation was $9,500, the highest $45,000. There were 50 grilles and registers installed in the latter.

Passing up opportunities wherein orders depended on low prices, Mr. Palmateer has been able to include many special features in Nassau Air Conditioning Co. projects. Such, for example, as acoustical treatment of mains, cooling with refrigeration, a high and a low register in major rooms, split systems, dehumidifying. Despite their relatively higher bids, the Nassau company has installed 50 per cent of all conditioning plants sold in their locality during the past year, stated Mr. Palmateer.

All ducts and fittings are made in this dealer's shop. Although the activity peak was so high last autumn that fabrication for stock was impossible, the sheet metal shop now is being equipped with numerous shelves and bins for future storage of finished fittings so that stock can be made up against demand.

Prices Per Opening

Thus far practically all Nassau (the name comes from the county wherein Port Washington is located) Air Conditioning Co. proposals incorporate oil-fired plants. The positive minimum per-opening

price to date for sheet metal work has been $18.00. Mr. Palmateer is authority for the statement that below this figure it is impossible to earn a profit in this area. From $20.00 to $24.00 per opening is the usual selling price he added. In making up estimates, however, price per opening is checked against material, labor and overhead costs and, if the latter exceed the per-opening estimate, the higher price is taken as correct.

Two salesmen work on building contractors, engineers and architects. Another salesman solicits owners of existing homes for plant replacement and conversion burner orders. Only the highest grade builders are contacted. Most of Nassau installations are made in new homes.

Interesting Engineering Ideas

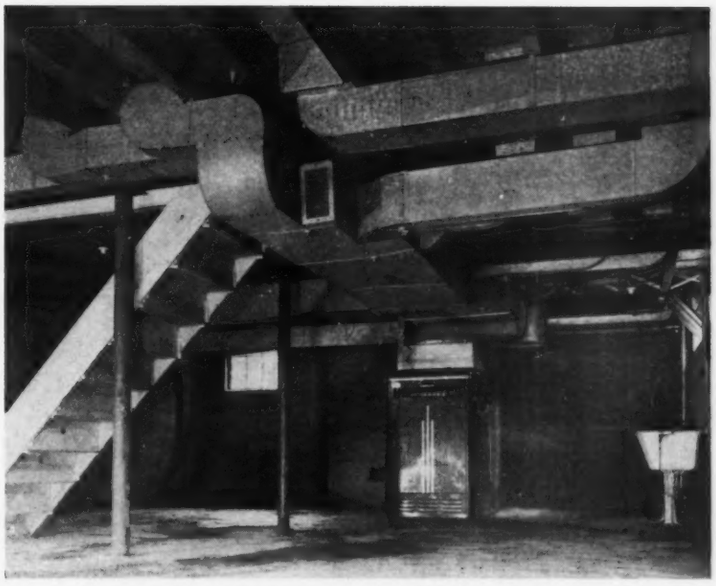
A feature of a typical layout is making provision for the future installation of summer cooling via refrigeration. This involves two supply grilles in a number of rooms such, for instance, as master chambers, living and dining rooms. The two grilles per room are connected to the same risers, one placed 7 ft. above the floor, the other at the baseboard. As damper-type grilles are used, room occupants can close one or the other grille according to season. Usually the upper grille is open in summer and the lower in winter.

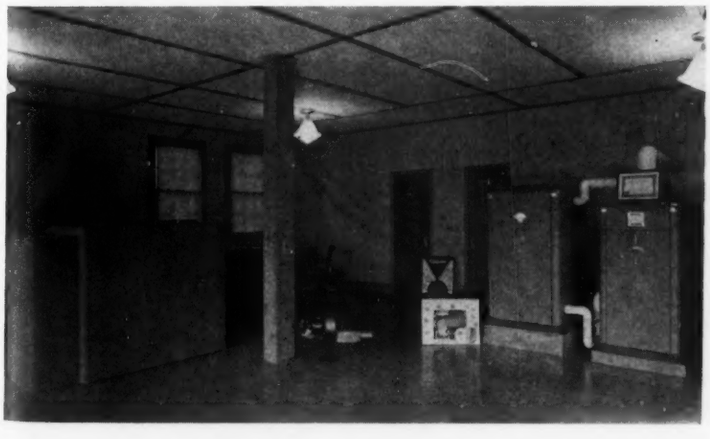
Another provision for future mechanical cooling is the air-supply duct design to include a large slide door in the duct adjacent to the heating plant so that either dehumidifying medium or expansion coils of refrigeration can be inserted when mechanical cooling subsequently is furnished. In a large number of installations mechanical cooling has been included, but in a far greater number the system is left so that this can be added later.

Doctors' and dentists' offices and waiting rooms, restaurants, bars and beauty parlors are among prospect classes that have been solicited and it is the avowed intention of the contractor to pay still greater attention to such commercial prospects. Already many doctors' offices have been conditioned by the Nassau people.

Furnace Cleaning

Vacuum cleaning likewise receives particular attention here. The work includes cleaning of ventilation and warm air ducts. This is considered essential whenever mechanical fans have been sold as modernization features of existing plants. The salesmen of this dealer not only offer oil burners but they also seek orders for fans and filters. Mr. Palmateer reveals that unless ducts are vacuum cleaned before installation of new fans the latter whip up so much dust in rooms due to the forced air circulation that furnishings and decorations may be damaged. Having sold the fans and cleaned the ducts and registers, the next step is to install filters to end the dust nuisance.





The Service Setup

The demand for burner trouble shooting has not been severe, but it is intended to encourage summer service rather than mid-season repairs. Shelving is about to be arranged in one end of the Nassau Air Conditioning shop at this time for handling regular summer service under annual contract. Mr. Palmateer refers to the new department as an oil burner "laboratory".

The proprietor wishes to avoid winter service altogether if possible. This contractor's light service truck is of distinctive appearance, being white, with black lettering. Attention attracted by its passage locally has proved good publicity.

Water Heaters and "Split" Systems

Two other divisions of Nassau activities concern water heaters, with necessary piping connections, including summer-winter automatic control. Their previous experence in the plumbing and steam heating business also enables this dealer to offer "split" systems of air conditioning. Standing radiation for remote rooms, with major rooms conditioned by warm air, has proved a sound arrangement in large, rangy buildings, stated the proprietor.

It is not believed, however, that such layouts will replace all-duct designs in this territory. The swing is the other way at this time, declared Mr. Palmateer, who revealed that all-duct system demand grows as the call for "split" systems wanes.

Automatic Anthracite Stokers

[Part 3—Adjustment and Performance]

By Paul A. Mulcey

Assistant Director, Anthracite Industries Laboratory
Primos, Delaware County, Pa.

ASSUMING that a satisfactory stoker has been selected upon a rational basis and that the installation is a good one, performance then depends directly upon the final adjustment of coal and air flow. To carry on a successful stoker business, however, there are certain factors of mechanical performance which must be thoroughly understood by salesman, installation man and service man before each goes into action.

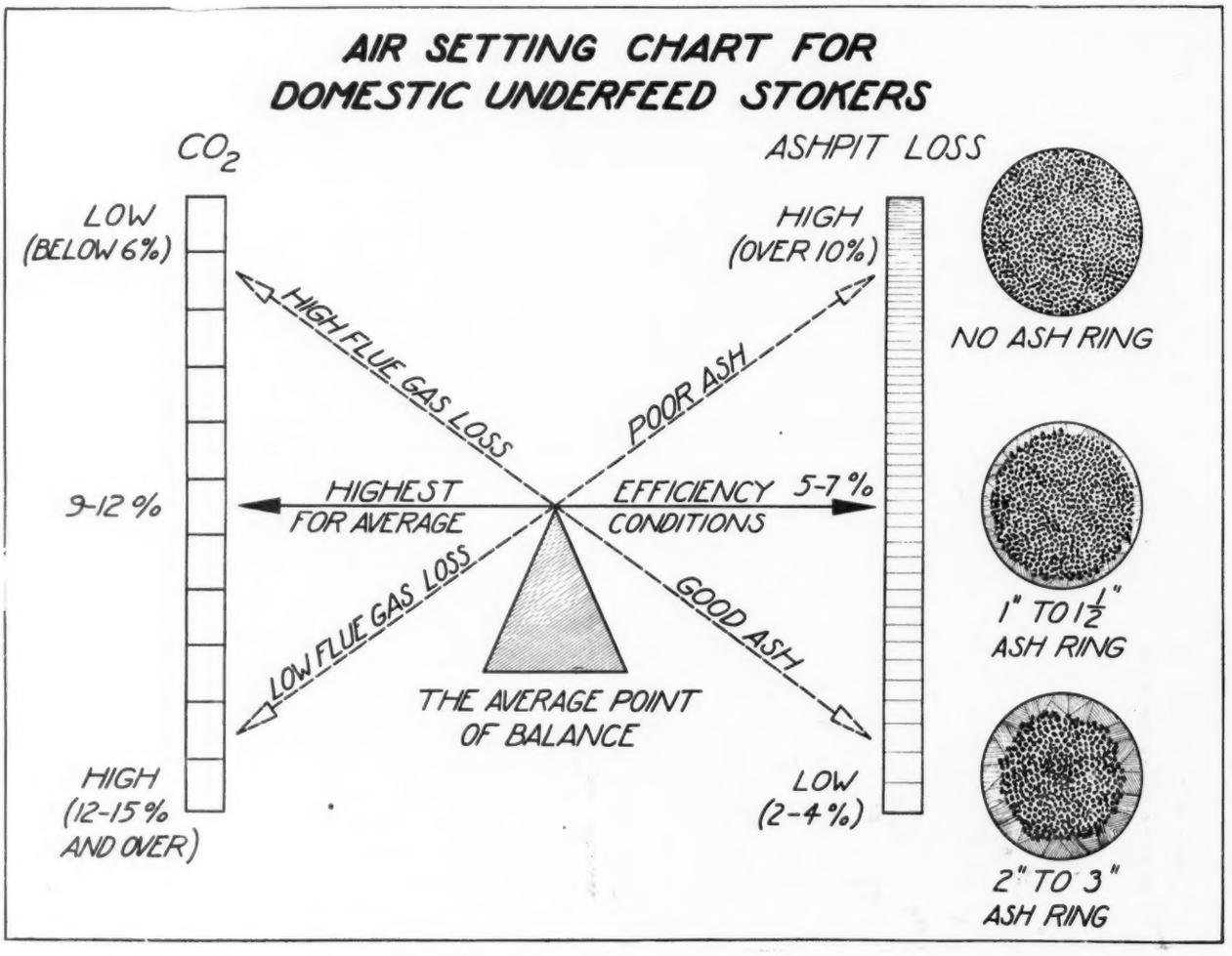
Mechanical Performance

The subject of stoker performance is simplified by considering the mechanical and combustion aspects separately. The mechanical operation should be judged on the following points:

1. Uninterrupted operation under normal load conditions.
2. Smooth and silent action of moving parts.
3. Adaptability of coal conveyor to reasonable oversize coal.
4. Adaptability of ash removal system to occasional clinkers.
5. Freedom from dust and coal tube "gassing."

Electrical Consumption

One question always in the mind of the consumer or prospective consumer is that of operating cost. A stoker, in addition to any possible service charges, also has its electrical consumption to be taken into consideration. This, however, is ordinarily a relatively unimportant factor. The United States Bureau of Standards requirements for domestic underfeed stokers is a maximum electrical



consumption of 18 KWH per ton of coal burned. For practical purposes the range from 10 to 20 KWH per ton of coal burned may be used. For example, assuming electricity at 2c per KWH, which is probably a good average figure for stoker applications, on a 30-ton per year installation, the maximum electrical cost will be $12.00 per year. On the other hand, a much lower figure is more probable and $6.00 to $10.00 would be a reasonable estimate.

Noise

The sound level of operation of any domestic equipment is of major importance to the consumer. The sources of sound in anthracite stokers are:

a. Fan (air flow and mechanical vibration).
b. Coal conveyor (effect of coal sizing may be important).
c. Ash conveyor (good air adjustment important to prevent coal and clinker from being ground in ash conveyor).
d. Vibration (sound insulation between stoker and heating system or building supports is highly important).
e. Mechanical (bearings, gears, sprockets, etc.).

Although the reduction of noise to a minimum is essentially a design problem, nevertheless installation methods are of equal importance. All of the above potential sources of noise may come into play if installation and combustion adjustments are not made in accordance with best practice.

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The air setting chart shown opposite illustrates the relationship between ashpit loss and flue gas loss in the operation of underfeed anthracite burners. While ashpit loss is shown directly, it is impossible to give the percentage flue gas loss except in the case of specific installations. For this reason the percentage CO_2 is used in its place, since this quantity is in inverse proportion to that part of the flue gas loss chargeable to a stoker. The percentage figures have NO DIRECT SIGNIFICANCE and are included merely to serve as an illustration and guide.

At the extreme right hand side of the chart are three rings illustrating the general appearance of a stoker fire under corresponding air settings. The top figure represents insufficient air and shows how high ashpit losses will result from the spilling over of incompletely burned coal into the ashpit.

The bottom circle illustrates the effect of excessive air, showing how the fire is caused to burn backward toward the center of the retort, leaving relatively large burned out areas through which useless air passes into the furnace to dilute the combustion gases and thus increase the stack loss. This, of course, is indicated by a low CO_2.

The central figure illustrates a well balanced fire resulting from the proper air setting designed to produce a reasonably high CO_2 while at the same time burning out the fuel to a point where the ashpit loss is not excessive.

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Overload Protection

The provision of adequate overload protection is essential to all mechanical devices, particularly those engaged in the conveying or handling of solid material. Stokers are protected by both mechanical and electrical devices, occasionally both. The commonest mechanical overload protection is that of the simple shear pin acting as an integral part of some linkage between the drive motor and conveyors. It is more often located between the speed reducer and main drive shaft. Sometimes a flat strip of metal is used in place of the pin, the basic principle, of course, being the same.

It is important in replacing shear pins that the new pin be of exactly the proper strength. The use of one which is weak may result in service calls caused by the passage of oversize coal which could ordinarily be handled. On the other hand, the use of pins which are too strong will eventually result in danger to the reduction gears or the drive motor. Electrical overload devices are available either as separate breakers or as an integral part of the motor casing.

The principal causes for overload in domestic stokers may be listed as follows:

a. Coal conveyor: Oversize coal, foreign material, etc.
b. Ash conveyor: Clinker; coal in conveyor; ash cans overflowing.
c. Mechanical Failure: Bearings, belts, gears, couplings, etc.

Combustion Performance

The purpose of a stoker is to burn coal in such a manner as to produce a maximum of **available** heat from the potential chemical energy contained in the coal and in the air. In order for a stoker to be 100% efficient in achieving this purpose it would be necessary for all the combustible to be completely burned with exactly enough air to supply the necessary oxygen. The products of combustion would then be divided into: (a) radiant energy which must be absorbed in the furnace or combustion chamber, and (b) gases resulting from combustion from which heat must be absorbed by convection, chiefly through secondary surfaces. Obviously, it is impossible for the furnace to absorb all of the heat in the gases or even all of the radiant heat. However, this loss cannot be charged against the furnace.

Stoker performance may be divided into: (a) the quality factor and (b) the quantity factor. The quality is measured in terms of (a) the amount of combustible material lost to the ashpit, and (b) the amount of excess air required for practically complete combustion. The quantity factor on the other hand is the actual **rate** of burning or number of pounds of coal burned per hour. In evaluating performance both the quantity and quality must be taken into account since neither alone will give the full picture.

Fan Setting

It is obviously impossible to adjust the air-coal

ratio in such a manner as to give perfect combustion. However, it is possible to produce a balance between ashpit loss and stack loss which will give the best possible performance of any stoker for a given combustion rate. This is done by adjusting the air setting until a suitable ring of ash appears around the edge of the retort. This ring will ordinarily be 1" to 1½" for the average small domestic stoker. For larger stokers as high as 3" may be desirable. The use of an Orsat flue gas analyzer may be very valuable in making air settings providing the general characteristics of the stoker being adjusted are fairly well known. It is important to remember, however, that the CO_2 analysis alone does not tell the whole story and that unless we know how much unburned carbon is going into the ash, we cannot be sure that the proper air-coal ratio has been obtained. It is often better to rely upon a single check of the ash ring than upon the incomplete evidence of the Orsat apparatus. (See Fig. 2.)

The presence of clinker and cracks in a stoker fire often indicate improper air setting. It is frequently possible to eliminate clinker by increasing the amount of air. If this does not produce the desired results the burner surface itself should be carefully examined to determine whether any of the tuyeres are closed or whether there has been any warpage of the metal parts.

Drafts

The furnace draft on stoker installations should be set with the assistance of a draft gauge. Unfortunately, too few dealers have one of these inexpensive instruments. A fairly accurate setting may be made, however, with the assistance of a match or candle. When the stoker is operating at maximum output there should be sufficient inward pull with the fire door open slightly to draw the flame gently over the fire.

A positive pressure is caused when there is insufficient chimney draft to carry off the combustion gases at the necessary rate. The building up of pressure causes these gases to seek other outlets such as cracks in the furnace, or in some cases back through the coal conveyor tube.

Fly Ash

The subject of fly-ash has already been touched upon in connection with the installation. The proper handling of this problem requires careful consideration of every possible method for making the installation gas tight and maintaining this condition; on the other hand, the elimination of pressure in the firebox is another method of attack which the service-man should not overlook. It must be remembered that fly-ash is greatly increased by high fan pressure. This means that where low stack draft occurs it is very desirable to maintain relatively low combustion rates within the load limits imposed by the installation.

Efficiency and Economy

Efficiency is a term used very frequently by salesmen in discussing the relative merits of various types of burners and competitive fuels. It should be remembered, however, that actual warm air heater and stoker efficiency or "nozzle" efficiency is far below the actual house heating efficiency. Since it is the latter which determines the actual economy of operation, we should learn to think in terms of house heating efficiency whenever relative costs are being considered. The following heat balance will illustrate this point:

	Furnace & Stoker	House Heating
Ashpit loss	4%	4%
Stack loss	20	8
Moisture loss	3	3
Radiation	10	0
	37%	15%
Efficiency	63%	85%

It will be noted that the ashpit loss and moisture loss remain constant since these losses take place

(*Continued on page* 59)

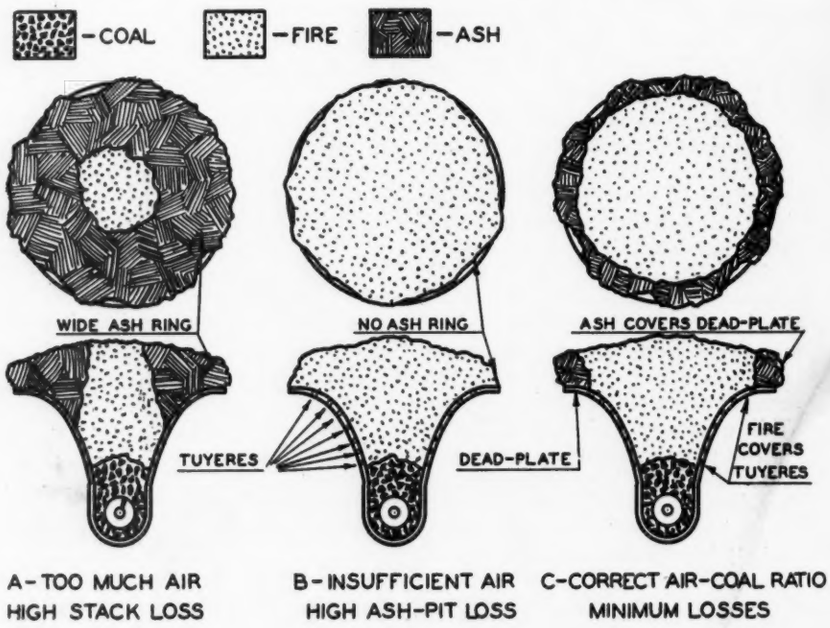
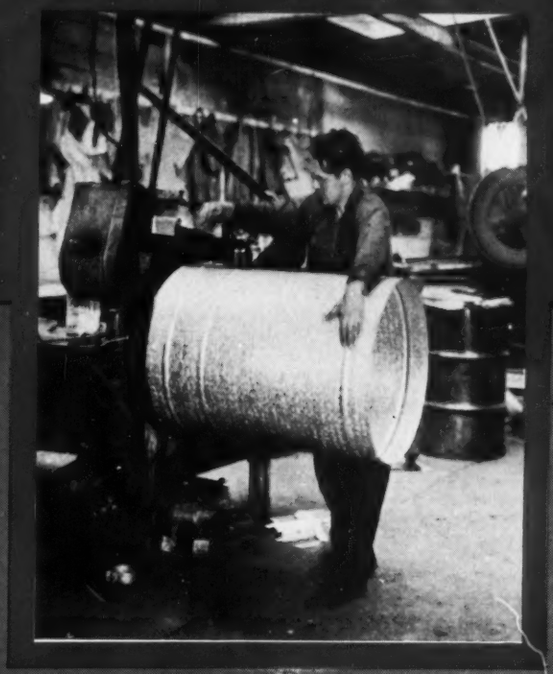


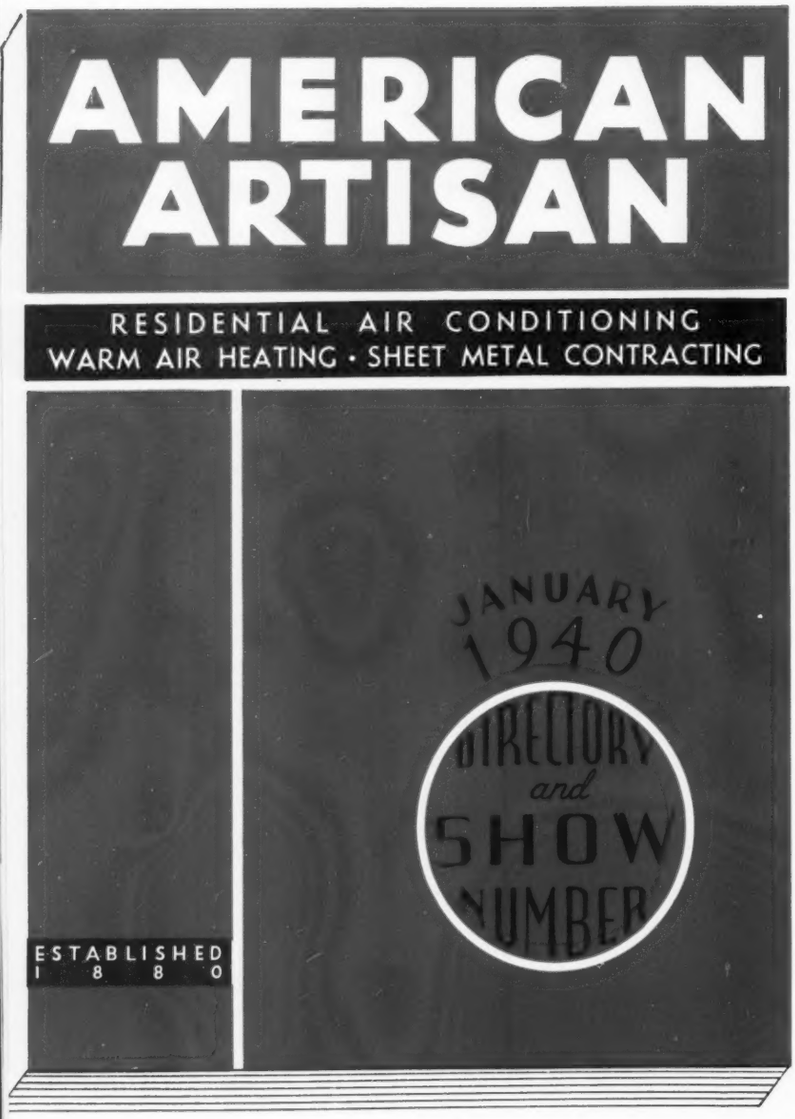
Fig. 2—The three diagrams show results obtained by varying the air volume supplied for combustion. Too much air (A) results in large amounts of ash, "blow holes" through the fire and high stack losses due to blowing heat up the chimney. Too little air (B) keeps much of the heat low down in the heater thus reducing heater efficiency. Approximately correct air volume, in anthracite stokers, forms an ash ring like (C) and permits maximum combustion and heater efficiency.

AMERICAN ARTISAN

SHEET METAL SECTION



DEVOTED TO SHEET METAL CONTRACTING AND FABRICATING



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IT...

The JANUARY 1940 ANNUAL DIRECTORY and SHOW NUMBER

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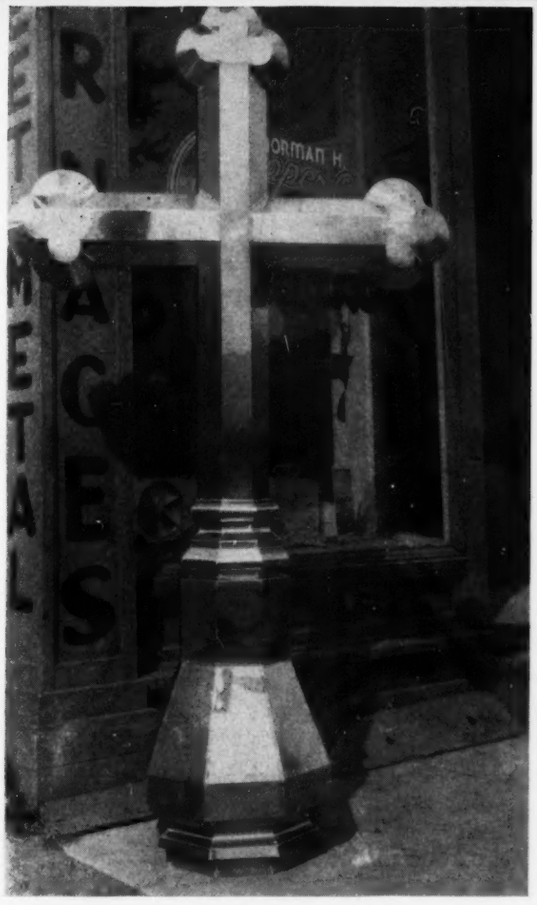
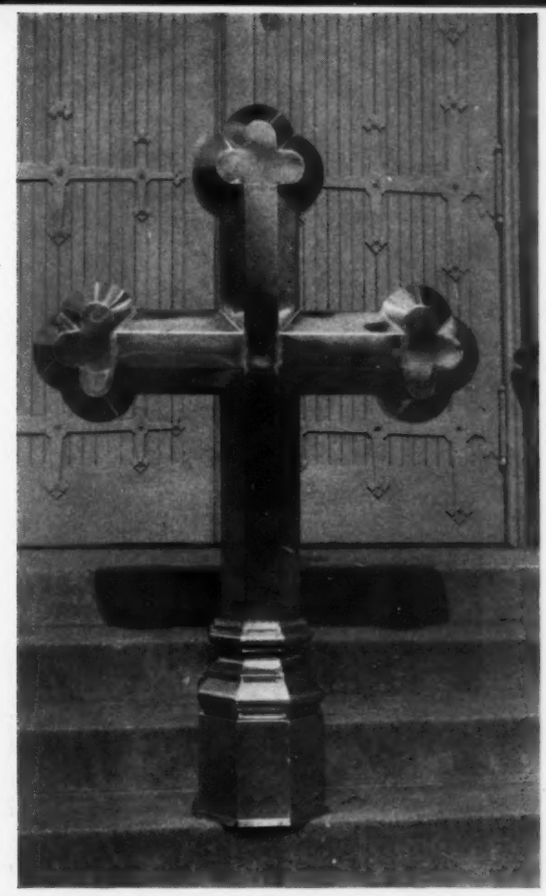




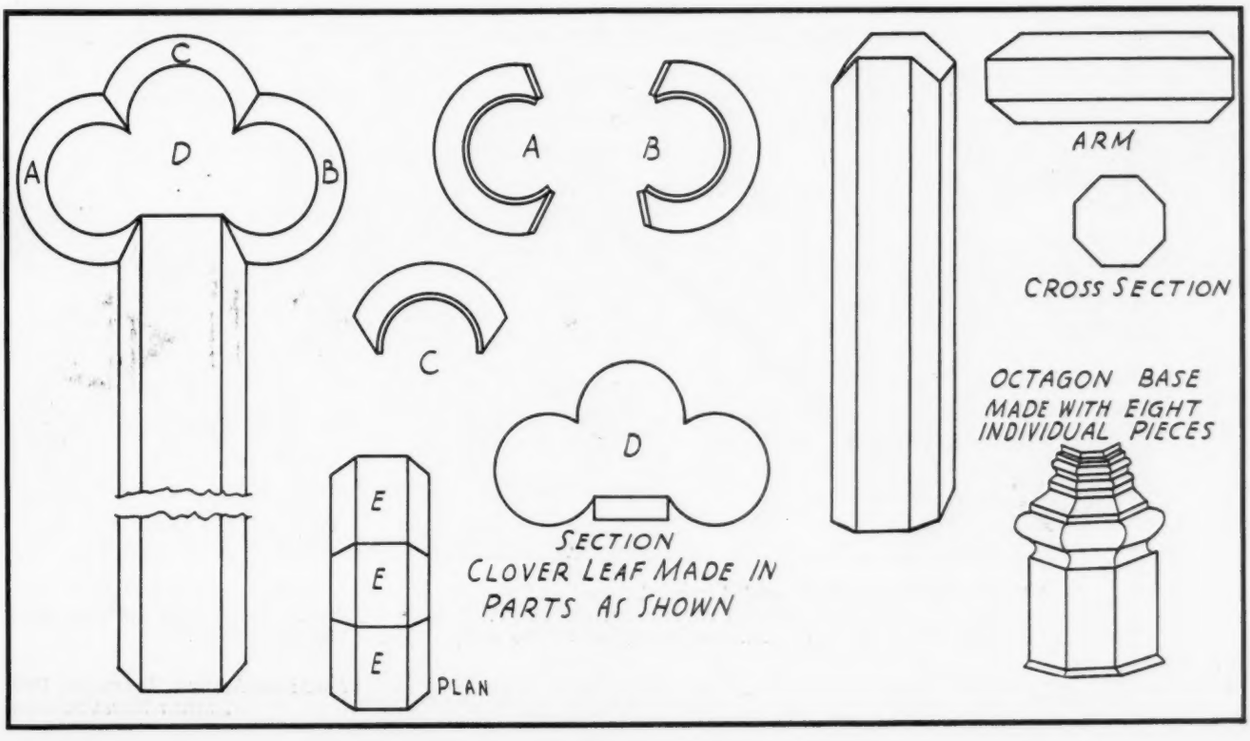
Stainless Steel Crosses

THREE of the largest stainless steel church crosses to be constructed and installed in Wisconsin in recent years were recently put on the St. Joseph's church in Milwaukee, Wis., by the Roesler Sheet Metal Co. of that city.

Milton Roesler, president of the firm, reports that the largest of the three crosses was 7 feet high and had a 3½-foot span. The base finial had a diameter of 28 inches.

The two smaller crosses were each 5½ feet tall, had a 3-foot span and a diameter of 20 inches at the base. All three crosses were made in eight sections and were octagonal in shape.

The eight sections were paneled and molded and fashioned together by hand. The sketches supplied by Mr. Roessler and the photographs show parts of the crosses as formed for assembly and the completed crosses. The crosses were erected on the church by William Kuptz, midwest steeplejack.



Sheet Metal Contractors Can Sell Sheet Metal Show Windows

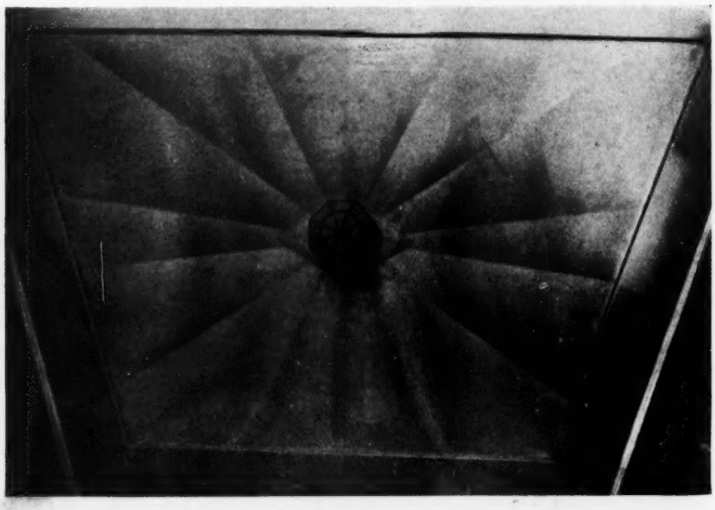
By Lawrence E. Gichner
Gichner, Inc.,
Washington, D. C.

TODAY 95% of the new store fronts in my city are being erected by glaziers. Once all this work was done by sheet metal men. Yowling against the injustice of this encroachment is of no avail.

With stock white metal cornices that are nailed in place, the glazier does a quick, neat and profitable job. There are no solder marks or seams. A strip clamped over the butted metal makes a weather-tight job.

What can the sheet metal man do to meet this competition? I have found one line of attack that works. It is ORIGINALITY.

By visiting the progressive cities in my territory and schooling myself in the modern trend, I am



At top of page—Old building refaced with enameled pressed board and a stainless steel marquise, top and middle cornice. The whole assembly was developed by architect and sheet metal contractor. Below—A simple stainless steel marquise with a sunburst ceiling, easily made in the brake, but not so easily duplicated in stock parts.

equipped with new ideas and approach the progressive customer with this argument: "What the glazier has to offer is mighty nice. But his is just stock stuff. There are dozens of similar designed fronts already in town. As long as you are putting in a new show window, why not get something that will attract special attention. What I have to offer is entirely different. And most interesting of all it is not going to cost you any more. Let us work with your architect in sketching you something original."

Some Typical Remodeling

To illustrate my point, look at these illustrations of these three smart fronts. Simple to construct, but most effective in results. One is aluminum painted black because the combination gives the desired rich dark tone qualities.

The vacant store picture well illustrates wall masking, cornice in the middle of the building and show window with ventilator. But the deep recesses which this construction shows, the lines and shadows are much sharper and distinct. The glass manufactured material definitely does not have this effect.

The ceiling panel shows how a sun beam effect can be achieved simply by putting the material in the brake and giving it a slight bend.

Above—A simple marquise suitable for the basement establishments so numerous in every large city. The ceiling plaques are plain dropped panels in the steel or pressed board ceiling.

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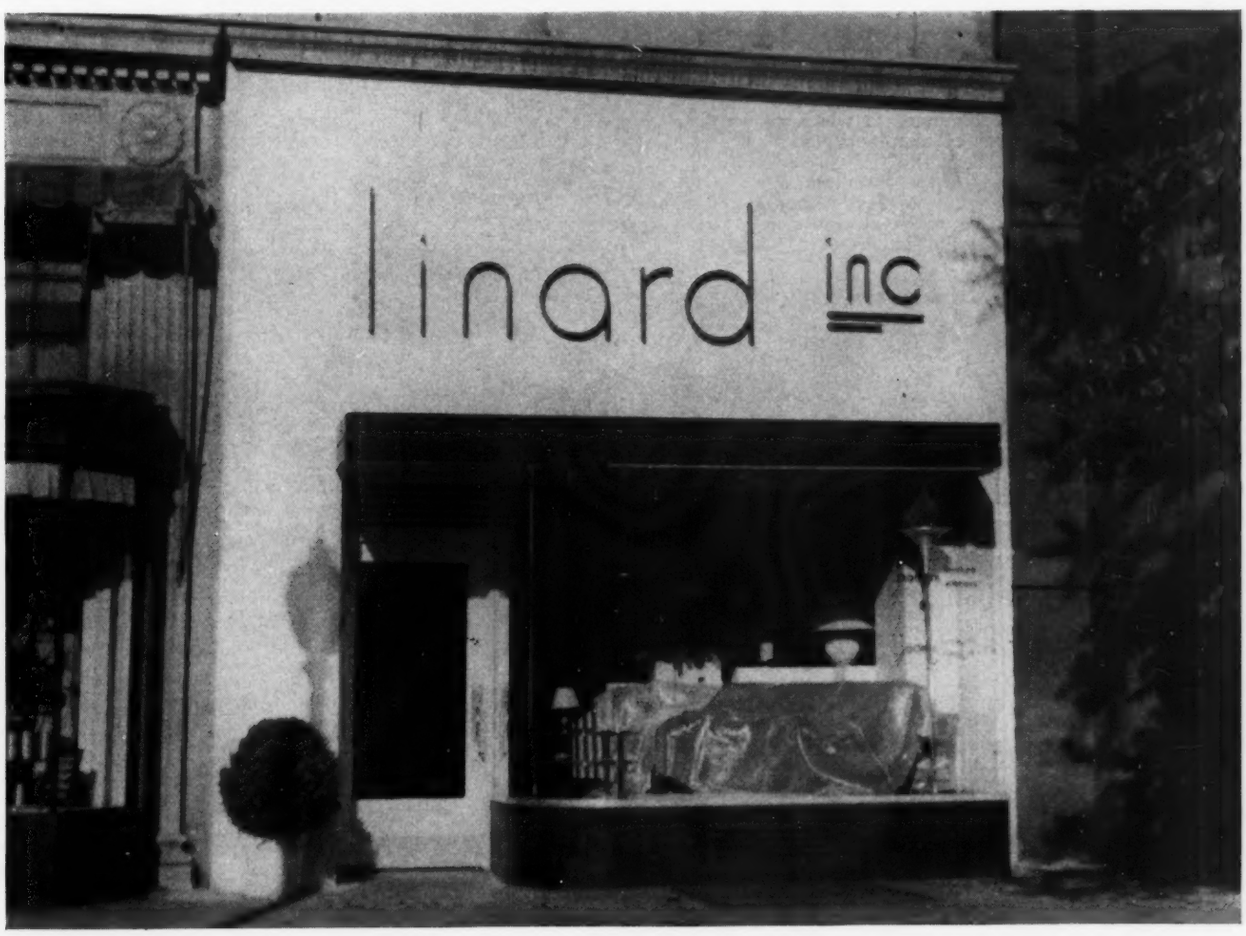
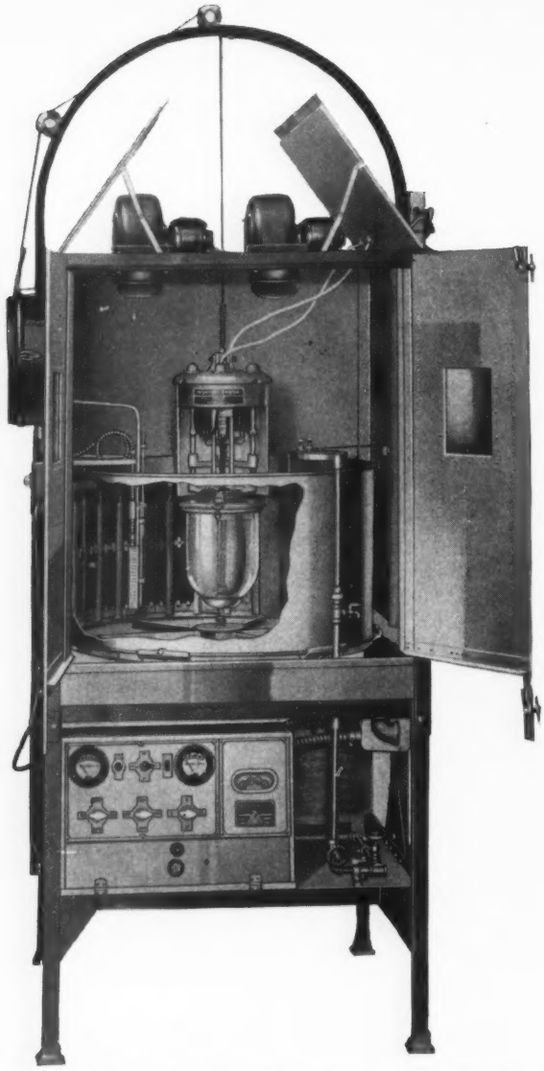
Below—Aluminum marquise and show window base-board painted shiny black to obtain the sharp contrast between trim and white building front. The complete assembly is ultra modern in design and effect. Fabrication is all straight work.



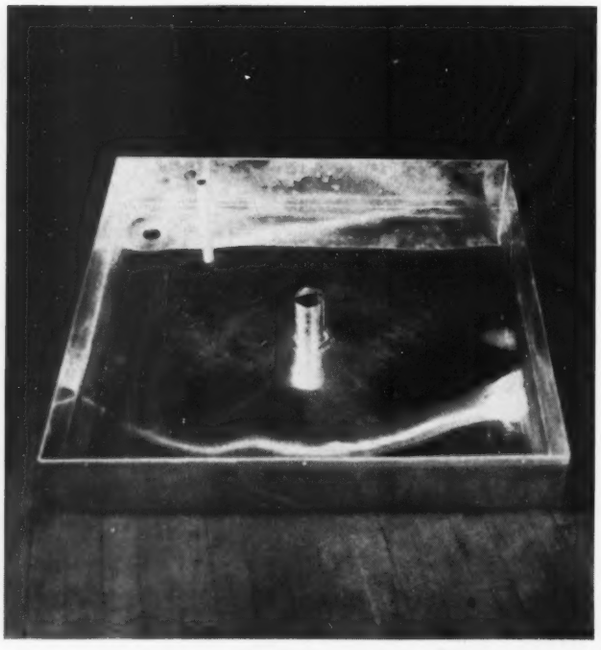
Accelerated Testing Machines Necessitate Perfect Sheet Metal Fabrication

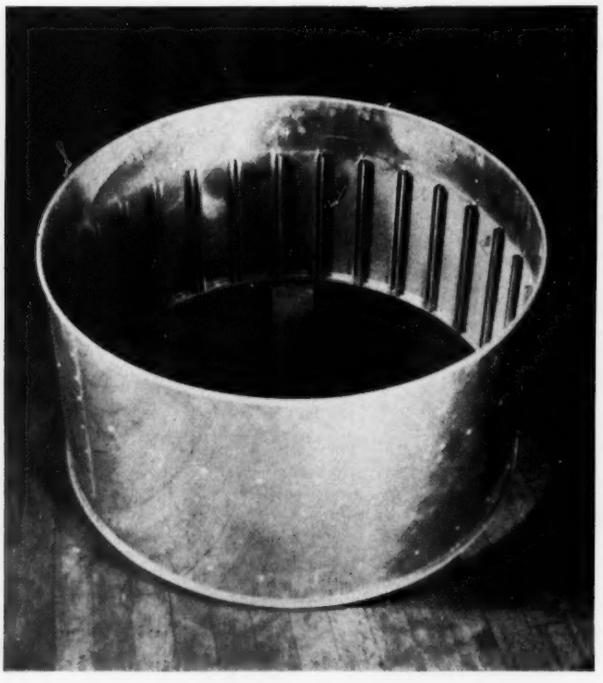


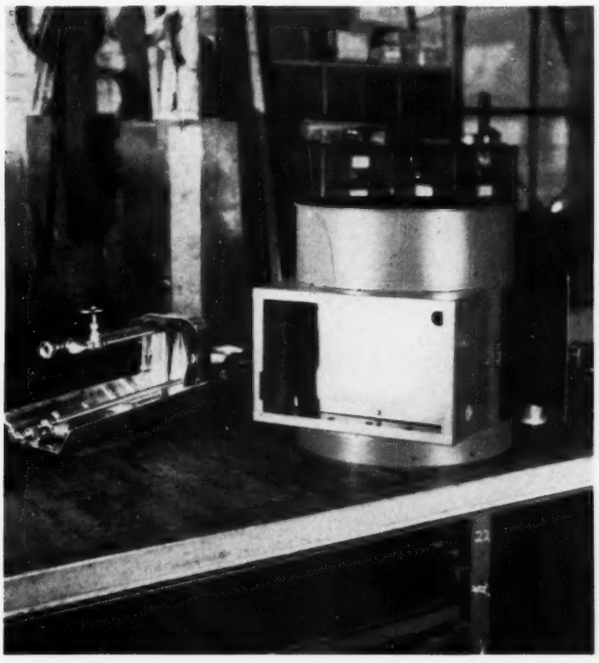
Above—The Weather-Ometer has a cabinet of 16-gauge aluminum; a sample drum (lower right photograph) of 20-gauge aluminum to which are riveted the sample holders of aluminum; and a spray pan (lower, left photograph) of 20-ounce copper, tinned on the inside, before forming. The complete machine, excepting mechanical parts, is fabricated by Williger. The text explains construction of parts in detail.

IT has become common practice for manufacturers to guarantee colors against fading, materials against weathering, paint bodies against cracking or too-rapid chalking, and numerous products used in the building field against the effects of wind, sun, rain, snow, time, temperature and exposure. Perhaps, as you studied these guarantees, you have wondered how the manufacturer could be so certain that his product actually would live up to the guarantee, particularly those long time guarantees covering products which obviously have not been on the market as long as the guarantee.

The answer is—accelerated testing machines. In this field the Atlas Electric Devices Company, Chicago, is a recognized leader with machines used by governmental agencies, manufacturers of all kinds and testing laboratories in 32 countries. These interesting machines produce within a few hours or







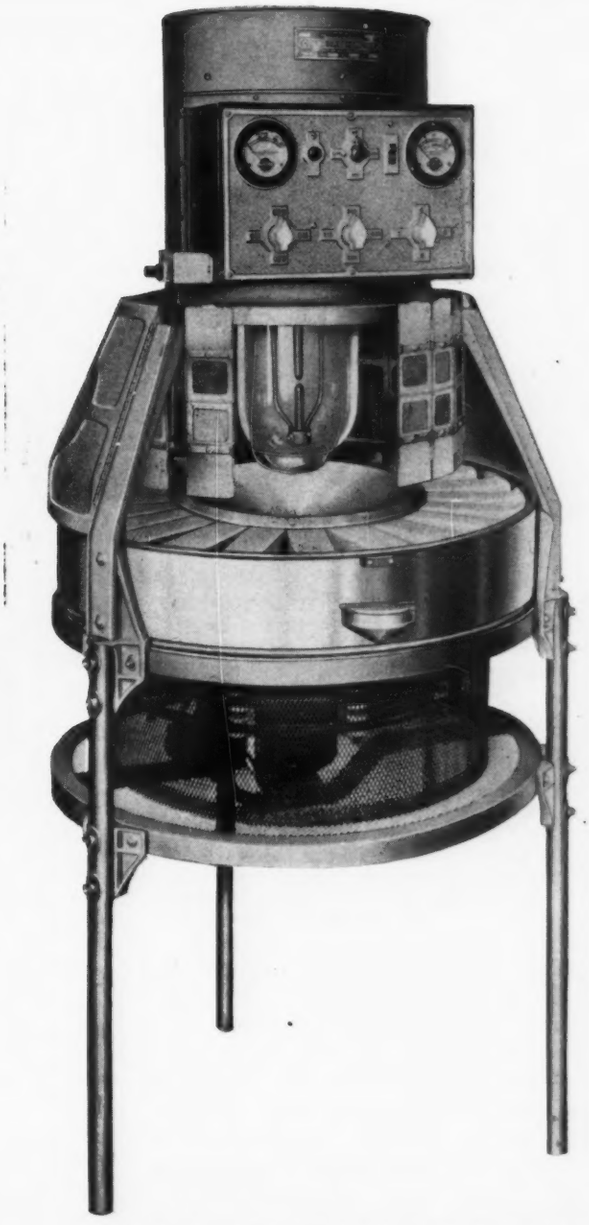
The lamp drum of the Fade-Ometer (right) is a cylinder rolled from 22-gauge auto body stock and cut for application of the control box which is 18-gauge. The cylinder is riveted.

days the destructive forces which, naturally, might take months or years to equal. Three machines, in particular, are of interest because in them many of the products of our industry are tested.

Three Interesting Machines

The first is the Fade-Ometer, an electric noonday sun, plus humidity and temperatures which predetermines the light-fastness of colors and colored

Edward Williger inspecting the Fade-Ometer pan (20-ounce, tinned copper). The bottom is double-seamed and soldered to the rolled rim which is stiffened by wiring. The inside opening is double seamed and wired, also.



The Fade-Ometer is an electric, noon-day sun to test color and light fastness. The various body parts, framework, shelves, pans, are fabricated in the Atlas shop.

materials. Two days in the machine equals a month of normal usages under a full June noon-day sun. The second machine is the Weather-Ometer which in a few hours, subjects materials like paint, asphalt, roofing or building materals to the same exposure as nature provides in several years. The machine subjects the product to light, heat, cold, water spray, plus any degree of gaseous, acid or alkali exposure. The third machine is the Launder-Ometer where the effect of soap, cleaners, bleaches, mechanical rubbing, etc., common to months of laundering can be ascertained within a few hours.

These machines, as the photographs clearly show, are intricate and interesting sheet metal fabrication problems. They are produced completely in the company's shop. The sheet metal department is under the experienced and skillful hands of Mr. Edward Williger, the Superintendent. Mr. Williger is a sheet metal craftsman handling numerous

The Launder-Ometer is built complete in the Atlas shop. The tinned, copper tub is fabricated from three pieces of 20-ounce copper. A Pittsburgh lock joins end to tub. The text explains construction of the various parts

materials and combination of materials which when assembled as a machine must be perfect in every detail. Since these machines are constructed of polished aluminum, stainless steel and copper and sell for hundreds and thousands of dollars, only master workmanship is permitted.

Fade-Ometer Sample Pan

The photographs taken in the Williger department show several of the parts in progressive fabrication stages, particularly those parts fabricated from materials used by all sheet metal contractors. The Fade-Ometer, for example, consists of an angle iron and pipe frame (all pieces formed on power cutters and benders) supporting a violet carbon arc with control mechanism and at the bottom machinery for making artificial wind, rain, etc. The circular pan shown is made from 20-ounce copper, tinned on the inside. The exterior rim is rolled and wired; the bottom is double seamed and soldered to the side. The top rim of the inside cone is also rolled and wired and double seamed to the bottom. Pieces are cut from patterns. The lamp drum (top of machine) is 22 gauge auto body stock, cut from pattern, rolled, top double seamed, and cut away for the control box which is 18 gauge. The cast parts shown are purchased outside.

Weather-Ometer Pan and Drum

The Weather-Ometer cabinet (see photograph) is an angle iron frame which Williger cuts and rivets, filling in the spaces between angles with 16 gauge aluminum. The view windows, accessory mountings, etc., are riveted in place. This cabinet is insulated with the insulation applied to the inside of the aluminum panels and spray painted with aluminum to give a water-proof surface. The panels of insulation are held in place by screwed on angles. The bottom is a square pan of 20 ounce copper, tinned on the inside. The stiffening edge shown in the picture is a ⅛ by ¾ inch brass bar.

The cut-away photograph shows the assembly of parts of the unit. The picture showing the mechanic seaming the square pan also shows the circular 20-gauge aluminum sample wheel of the Fade-Ometer. Another picture shows the finished pan on the shop floor. The small clips which show on the drum interior are all cut by hand from templates and are riveted to the side of the drum. The drum is held on a spider which revolves the drum and samples under a spray. The drum is 20-gauge aluminum. There is no top or bottom to this drum; the drum is rolled from two pieces of aluminum which are joined by lap riveting. The drum is stiffened top and bottom with a rolled rim around a ⅛ by ⅜-inch brass bar.

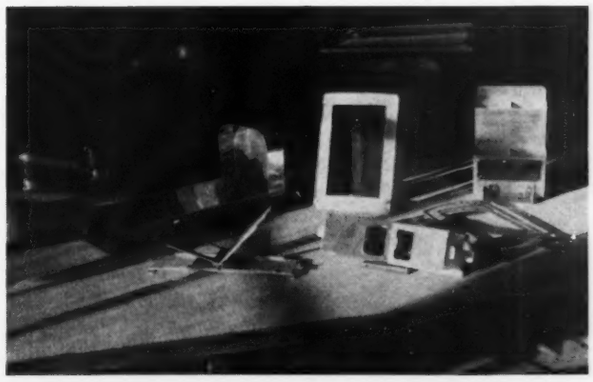
The control box of this machine is also 22 gauge auto body stock.

Launder-Ometer Copper Tub

The Launder-Ometer contains a hub to which are attached several glass jars in which the washing solution and materials to be tested are packed; the angle iron frame is comparatively simple as the

On the bench is the sample holder of the Weather-Ometer. All parts are 20-gauge aluminum. The mechanic is double seaming the bottom to the rim of the Weather-Ometer pan.

photograph shows. The tank on this machine is made of 20-ounce copper, tinned on the inside and is composed of three pieces—the two ends and the



At left—The freezing cabinet built of angle iron, plywood and insulation. The actual freezing compartment is a small box (about the size of the bottom part of the lid) built of $\frac{1}{16}$-inch copper plate on which Williger winds direct expansion coils. The whole is then tinned. Above—Small parts for various machines. The part looking like a humidifier is the spray baffle of the Weather-Ometer. The ladies compact affair, directly in front, is a sample holder for test samples for the Fade-Ometer lamp. The photograph frame piece is a specimen holder for wall paper. The display case-like box at the right is one type of extra carbon holder. These parts are all made of 20-gauge aluminum and require intricate craftsmanship for the many small pieces which make up each item. All pieces are either stamped on Williger's specially set-up presses or cut by hand from templates.

drum proper. The top of each end is bent out at right angles to form a wide edge; the drum is also edged so that when the three pieces are put together there is a wide, horizontal rim all around which turns down over the frame. The seams which join ends to drum are Pittsburgh locks; the Pittsburgh is on the drum and the ends are edged to go into the Pittsburgh. The seam is soldered.

The lid is made from 20-ounce copper, tinned on the under side and is formed from one sheet. A turned back and turned down edge, with fold, acts to stiffen the lid. Further stiffening is obtained from the long, cast aluminum hinges which show in the photographs.

Freezing Cabinet, —50° F.

A machine not previously mentioned and called a freezing cabinet in which temperatures as low as 40 degrees Centigrade below zero can be obtained is shown in another photograph. The angle iron frame is riveted as shown and in the angles a plywood paneling is inserted. The plywood is covered on the outside with galvanized iron. The machine compartment has panels of expanded metal. The actual freezing chamber is relatively small—the insulation must be so heavy that it requires thick walls—and is built of $\frac{1}{16}$-inch copper plate on which the copper coils (direct expansion) are wound. After the coils are wrapped around the chamber the whole is tinned inside and out. Williger clips the tubing onto the copper box.

Mr. Williger has experience which goes back to over 45 years. Before taking the position of Supt. of the Atlas Company sheet metal department, 16 years ago, he specialized in industrial work such as ventilators, fume cabinets and such similar exacting work.

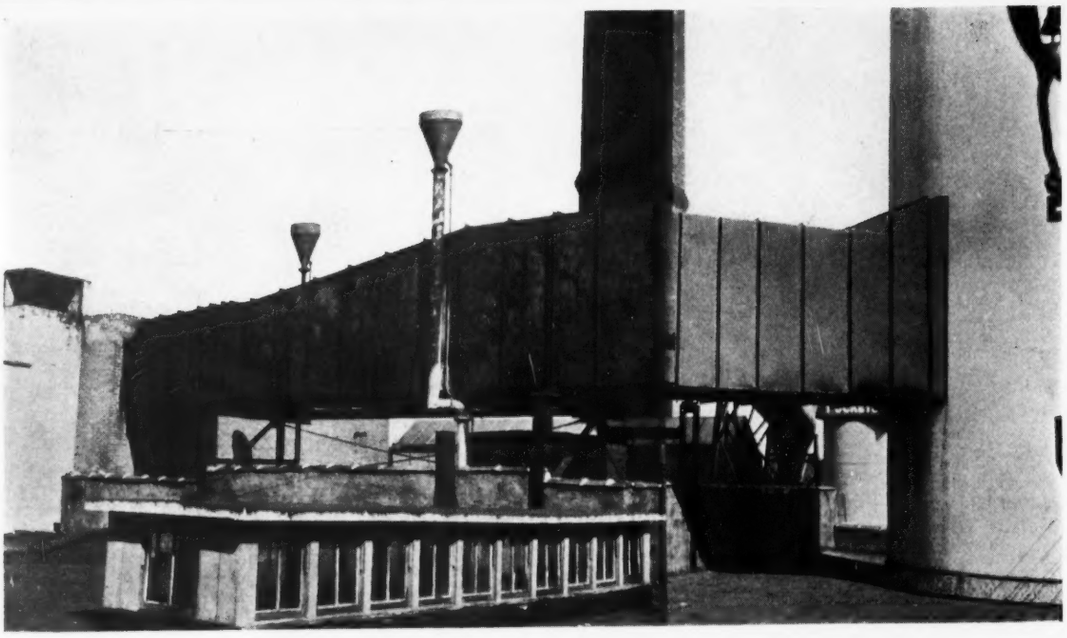
Reductions In Small House Costs

(Continued from page 25)

with house remodeling, we know that $3,000 on an old house will work wonders. Given a basement, a sturdy framework, walls which will support shingles, or siding and a new roof, floors which can be relaid or covered, that $3,000 will buy lots of good heating, a substantial roof, lots of paint and wallpaper, even a night air fan for summer cooling and the final cost will be not more and probably less than a new house full of gadgets.

We appreciate that this argument probably can be shot full of holes. Nevertheless, if there is, as we read, some four billion dollars worth of repossessed, unsold properties which never will bring the amount for which they are mortgaged, perhaps there is some point in writing off these properties so that some low income families can obtain more space, a better house, a home which will be satisfactory twenty years from now.

As an industry, we have seen the satisfaction obtained under FHA remodeling of existing dwellings. Perhaps some thought on how run-down properties can be remodeled and sold at prices within the income of families able to afford a $5,000 home would solve both the problem of the foreclosed property and the problem of houses for the man of limited income.

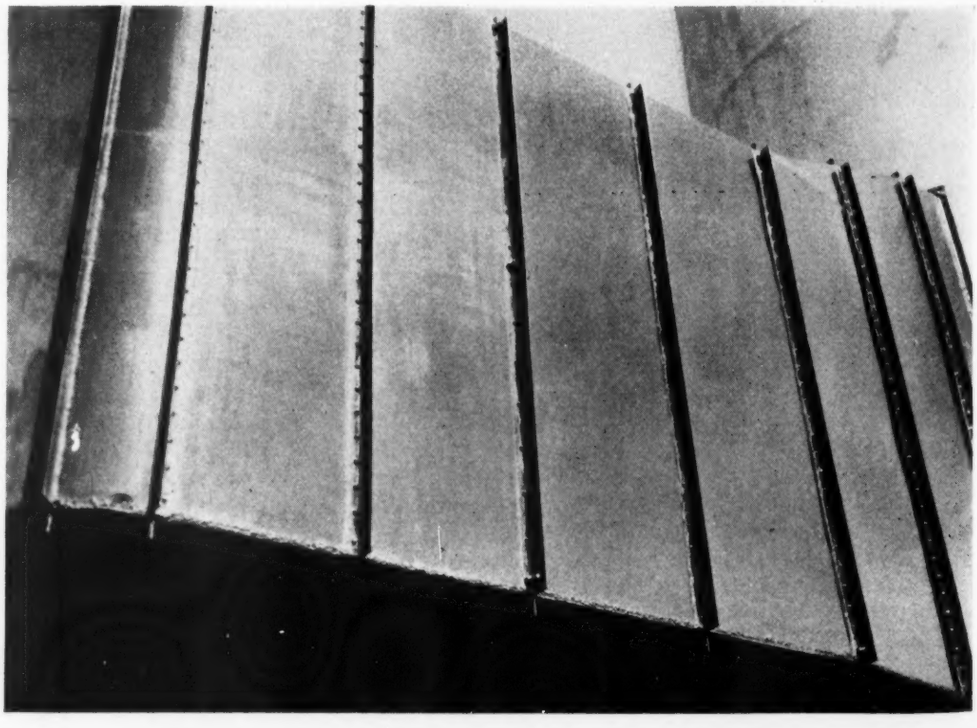


8-Gauge Round (New) and Rectangular (Repaired) Smoke Pipe Breeching

THE Jacob Brenner Company, Fond du Lac, Wisconsin, recently completed an unusually heavy sheet contract involving the fabrication of a completely new 8-gauge, 50-inch diameter round pipe, two elbow smoke breeching, and the reconstruction of a portion of a very large rectangular smoke breeching which had been eaten away by the products of combustion.

The repair of the rectangular section required the construction of a new top for the stack section of the breeching. Eight-gauge plates with heavy angles for reinforcing were cut and welded into a complete top section and placed in the breeching. To tear out and replace the side sheets would have caused some inconvenience and, as inspection showed the up and down angles to be in good condition, it was decided to apply new sheets between angles right over the old sheets.

The Brenner Company brought its portable, DC arc welder to the job, cut the sheets to size in the shop and welded the sheets to the old angles over the old plates without disturbing the breeching



Above—General view of the rectangular breeching showing (next to chimney) the section repaired with a completely new top and sides repaired by welding 8-gauge sheets directly over the old panels.

◆

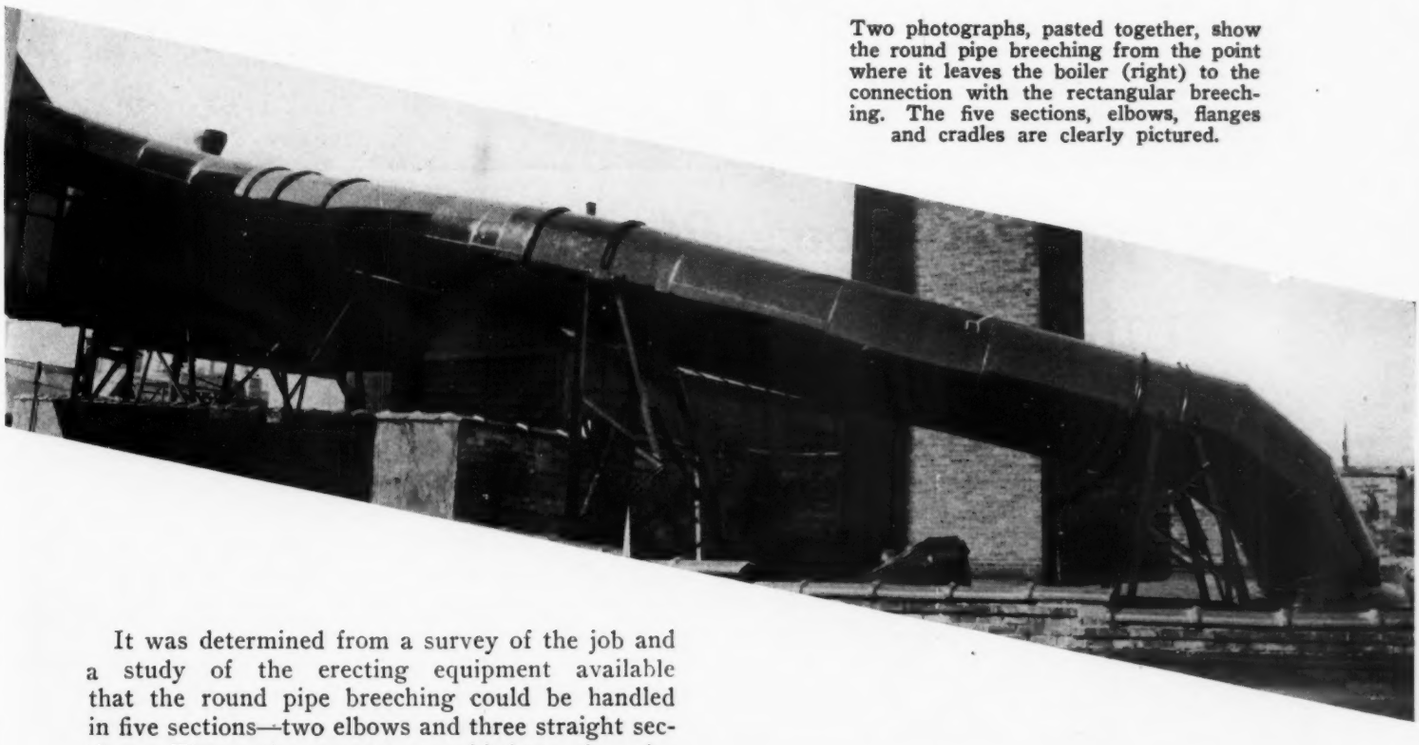
Right—Closeup of the repaired breeching section showing the new 8-gauge panels arc welded over the old sheets and to the reinforcing angles. This method simplified welding and reduced appreciably the labor involved in tearing away the old breeching had this been decided upon.

sides. One of the photographs shows the welds clearly. Note that the riveting of the old sheets was not touched but there is, to all intents and purposes, a completely new breeching section. One hundred pounds of welding rod were used on this part of the work.

Round Pipe Fabrication

More difficult to build and erect was the new round pipe breeching from a reconditioned boiler which had been previously out of operation. This pipe is about 50 inches in diameter, of 8-gauge plate and was built in sections which could be handled conveniently.

Sheets 156 inches long were rolled to form in the power rolls; after rolling, the ends were arc welded to form cylinders which were assembled into sections which could be handled. The welded cylinders were also arc welded into sections, taking care that cylinder seams did not coincide in the section.



Two photographs, pasted together, show the round pipe breeching from the point where it leaves the boiler (right) to the connection with the rectangular breeching. The five sections, elbows, flanges and cradles are clearly pictured.

It was determined from a survey of the job and a study of the erecting equipment available that the round pipe breeching could be handled in five sections—two elbows and three straight sections. The sections were not welded together—instead heavy angles were welded to the pipe at section ends and these were bolted together over gaskets. The sections and the bolting angles show clearly in the photographs.

Erection Procedure

Pipe sections and frames were first raised by a gin pole to the roof of the boiler room. Then the angle iron cradles shown were placed in position. Brenner fabricated these cradles and welded each as a complete unit in the shop ready for erection. The gin pole was then taken to the roof and used to place pipe sections in position. An idea of the weights involved can be gained from the fact that the last elbow which enters the rectangular breeching) weighed more than one ton.

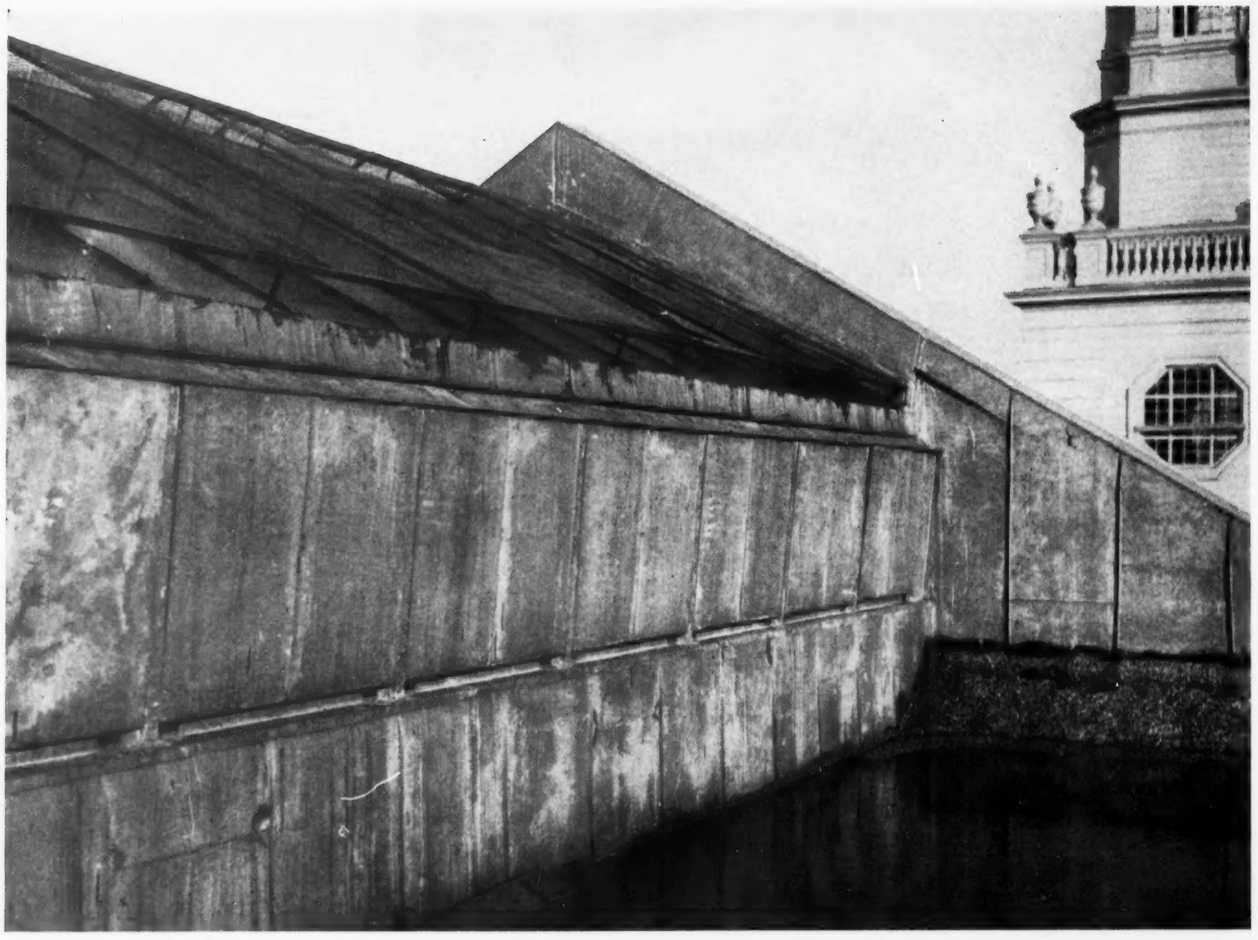
Round Pipe into Rectangular

By means of a cutting torch the hole was cut in the rectangular breeching for insertion of the round pipe. The round pipe projects into the rectangular breeching like an inverted scoop for several inches to insure adequate draft in the round pipe. The meeting line of the round pipe and the rectangular breeching was closed by arc welding using the portable welder.

Boiler Breeching Section

One additional fitting was required. This is a transition from the 50-inch round pipe to a 37 by 50-inch rectangular to join the round pipe with the smoke outlet of the boiler. The installation of this transition was difficult because the fitting had to be placed beneath the boiler room roof in a very restricted space between the boiler end and the wall. The transition is arc welded to the round pipe just above the roof collar which shows in one of the photographs.

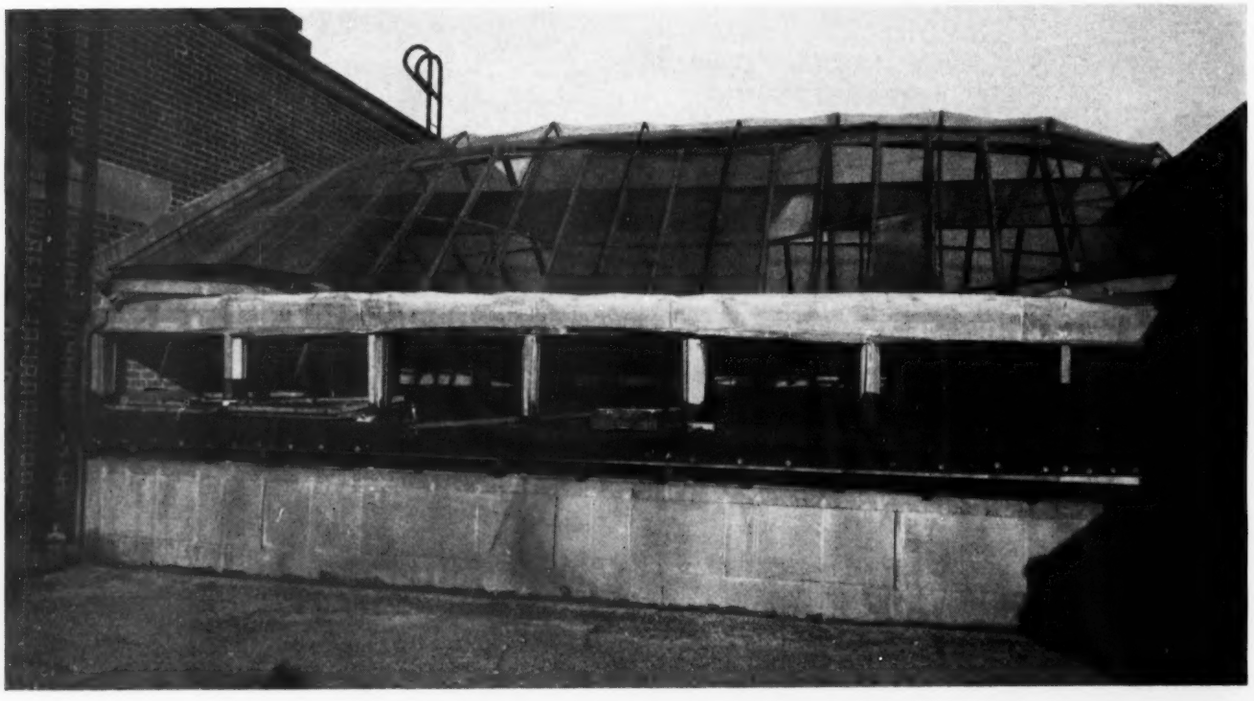
Necessary patterns for the pieces which make up the elbows were made in scale and projected to finished size. Since the Brenner Company is well equipped with power shears and rolls (the company makes furnaces, January, 1939, American Artisan) no difficulty was encountered in forming and welding the cylinders and sections. For all the work involved some 16,000 pounds of 8-gauge sheet were required.



New England Hurricane Proves Value of
Integral Steel Frame Skylights

IN September, 1938, parts of New England were visited by a hurricane which caused great damage. From approximately New Haven on the west to the Cape Cod Canal on the east, a wind velocity up to 105 miles per hour caused more destruction to property than any storm ever recorded in New England. Cornices, roof sheet metal work and skylights seemed to be special targets for the gale. In many instances even solid masonry yielded, also, to the overwhelming forces of direct attack and indirect vacuum reaction.

A point of particular interest to our industry was



On facing page: At top, skylight with integral steel frame erected in 1937 and undamaged by the hurricane. Below, skylight nearby, also erected in 1937, without steel frame and practically demolished by the hurricane.

◆

the effect of the hurricane on skylights. Where skylights were properly constructed, according to the standards our industry has set up, there was no damage whatsoever. But in instances where improper construction or flimsy construction were evident, there was havoc. Many striking examples were available for study.

On the Worcester Art Museum, where the skylight area is approximately 12,000 square feet, there was only one light of glass broken by flying debris. The Worcester County Court House, which is closely adjacent, lost approximately forty per cent of its copper roofing and skylight work. At Andover Academy there was not even one broken light of glass in the large skylight surfaces of the Addison Art Gallery and the indoor baseball cage where the skylight area is approximately 16,000 square feet.

It seemed evident from these and numerous other examples that the skylights which withstood the wind were constructed of an integral steel frame with connection steel to steel of all bars, hips and ridges. The drainage and weather members were applied so as to provide freedom of movement. In all cases where the skylight was undamaged the glass lights were installed in reduced lengths so as to set up no winding stress in the glass.

The accompanying photographs show what happened to two skylights within two miles of each other. One skylight failed to have the necessary strength in its steel framing. The other skylight, where proper strength was obtained, shows no damage. These two installations are identical and were installed at about the same time.

Skylights, no matter if architects consider them necessary evils, continue to be advantageous because they let daylight into otherwise unlighted quarters. Skylights can be constructed to have the necessary strength to withstand wind pressure directly upon the outside or withstand the explosive effect of an inside vacuum set up by hurricanes. Whereas small skylights can be constructed without reinforcing bars, large skylights need the support and inherent strength obtained only with a complete steel framing, if hurricane history is any criterion.

Material Estimates For Copper Roofing*

IN estimating the amount of sheet copper which is required to cover a given roof area, the type of roofing, size of sheets, size of seams, and size and spacing of cleats must all be considered. To facilitate estimates the approximate quantities resulting from the commonly used sheet sizes in the three different types of copper roofing have been tabulated in Table VI.

The first column gives the square feet of copper required to cover an area of 100 square feet. The figures are based on 2″ × 2″ tapered battens, 1 inch finished standing seams and ½-inch flat-lock seams.

The amount for cleats given in the third column assumes a spacing of 8 inches for batten and standing seam roofing, and two cleats on the long sides and one on the short sides of the sheets in the flat seam construction. Cleats are assumed 2 inches wide in all cases.

The third column gives the quantity of 1-inch nails required assuming two nails per cleat and 270 nails per pound.

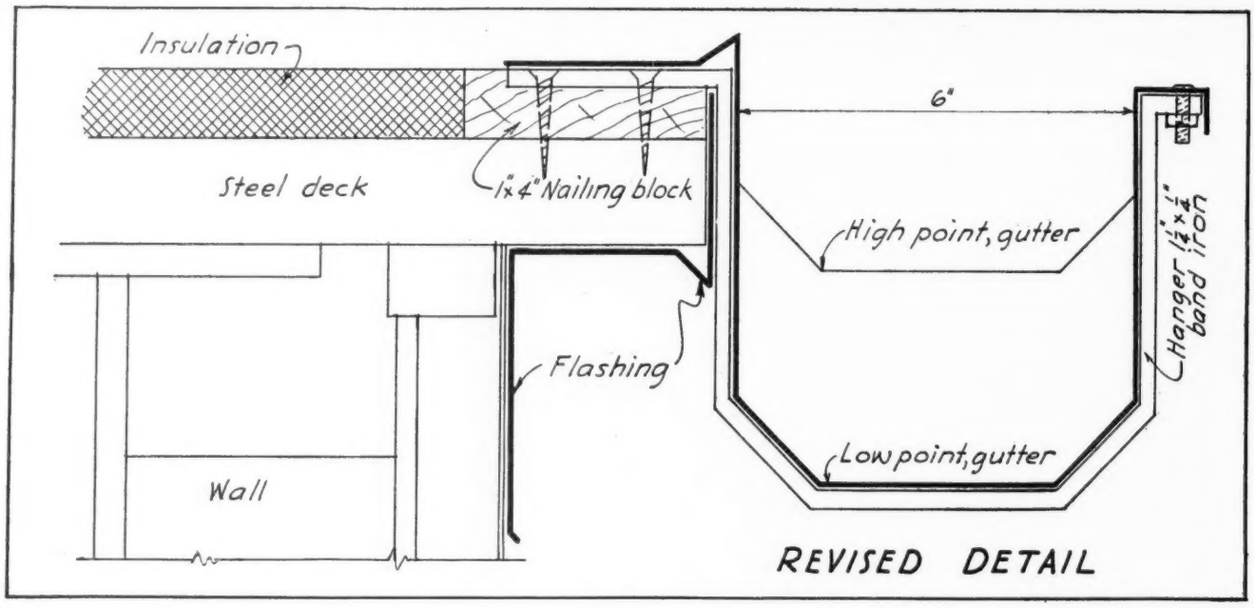
The last column is a sum of the first two, and represents the total amount of sheet copper required per roofing square. These factors can be used as percentages to be applied to the total square feet of roof to be covered, to give the square feet of copper required.

*From "Sheet Copper," by the Copper & Brass Research Ass'n.

TABLE VI

APPROXIMATE MATERIAL QUANTITIES PER ROOFING SQUARE (100 SQ. FT.)

	Copper Sheets (Sq. Ft.)	Copper Cleats (Sq. Ft.)	1-Inch Nails (Lbs.)	Total Sheet Copper (Sq. Ft.)
Batten Seam—24″ x 96″ sheets	134	6	1⅓	140
Batten Seam—30″ x 96″ sheets	127	5	1	132
Standing Seam—24″ x 96″ sheets	115	3	⅔	118
Flat Seam—14″ x 20″ sheets	121	7	1½	128
Flat Seam—18″ x 24″ sheets	117	4	1	121



An Improved Gutter Specification

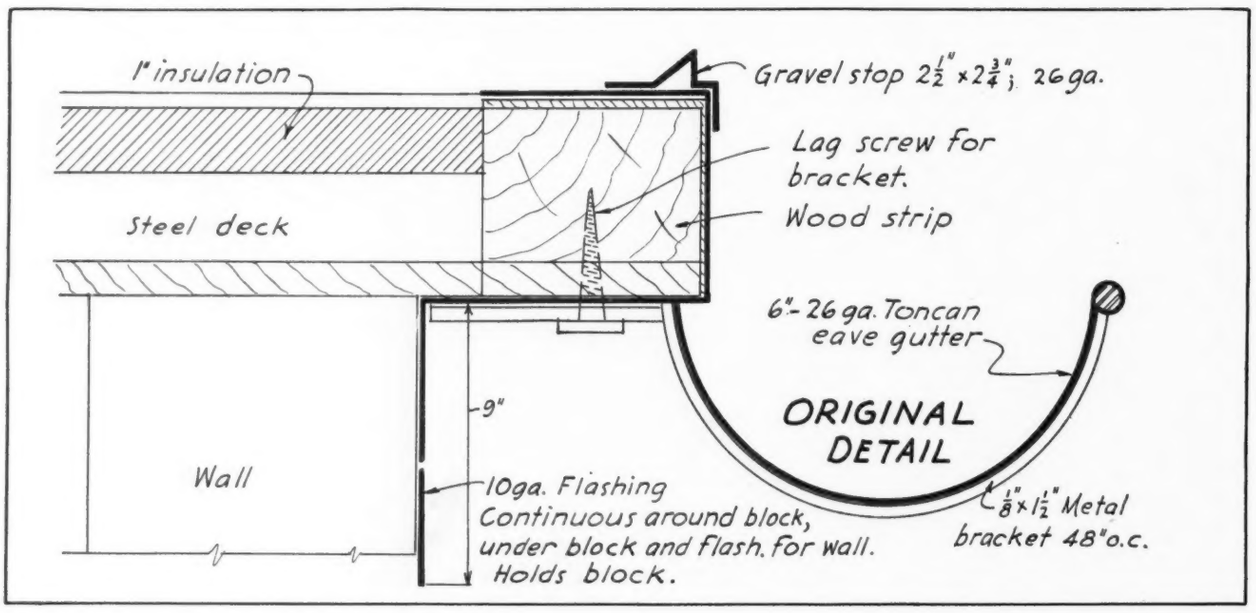
CONTRACTOR Joe Dersher, Toledo, Ohio, recently encountered an interesting problem in which a sheet metal man's knowledge of good and bad metal construction enabled him to explain to an architect why a gutter and gravel stop detailed for an industrial building would likely result in a flimsy construction whereas a more substantial construction would result in long, trouble-free life.

The original detail and the revised construction suggested by Contractor Dersher are shown in the accompanying sketches.

This gutter drains a large, flat, built-up roof. It was specified that the roof should project beyond the wall, but the roof structure proper did not carry out beyond the wall for the total projection. Therefore, on the original detail, a wood strip was run along the outside of the steel deck (which, as shown, is topped by 1 inch of insulation) and the problem was to find support for this wood strip.

As shown on the original detail, this wood strip was supported by a 10-gauge, continuous flashing strip which was to be bent around the top, outside face and bottom of the wood strip and was then to continue down the wall and be supported by bolting to the wall.

The gutter, in turn, was to be supported by a ⅛


1" insulation
Gravel stop 2½" x 2¾"; 26 ga.
Lag screw for bracket.
Wood strip
Steel deck
6"-26 ga. Toncan eave gutter
9"
ORIGINAL DETAIL
Wall
10ga. Flashing Continuous around block, under block and Flash. for wall. Holds block.
⅛" x 1½" Metal bracket 48" o.c.

by 1½-inch bracket which was to be lagged through the 10-gauge strip and into the wood strip. The gutter was to rest in these brackets.

Contractor Dersher's contention was that there were too many parts of the assembly depending on other parts and no one part was given sufficient basic roof support. The result, therefore, was likely to be a general loosening throughout the construction since too much depended upon the 10-gauge flashing strip.

The revised detail submitted, as shown, calls for the steel decking to be carried out for the full projection. On top of the steel deck the insulation is cut short 4 inches and a 1 by 4-inch nailing block is laid. The flashing strip in the revised detail carries no weight but its own and acts as a true flashing rather than a gutter support. The nailing block is then cut out at points where the gutter brackets are fastened to provide a smooth top.

The gutter brackets are screwed onto the top of the nailing block and through the block into the steel decking. The flat, top section of the bracket, therefore, obtains proper support from the steel deck, both at the top and alongside the front face.

Contractor Dersher also suggested a change in shape and size of the gutter, detailing a considerably larger gutter cross section which was necessary for the large expanse of roof to be drained. Also, the change in bracket shape and the revised outside edge of the gutter makes it possible to bolt the gutter to each bracket, thereby stiffening the whole assembly.

In place of the separate gravel stop detailed originally, the gravel stop is now a part of the gutter, further stiffening the assembly and reducing the number of pieces requiring nailing or fastening to roof members.

Contractor Dersher reports that the better construction plainly indicated in the revised detail was readily accepted.

Neubecker Pattern For Round Pipe "Y"

(*Continued from page* 32)

and place it as shown by *A-B* in the pattern. With *A-C* in half plan as radius and *A* in pattern as center, describe a short arc near *C* and intersect it by an arc struck from *B* as center with *B-C* in half plan as radius. Draw lines in pattern from *A* to *C* to *B*, which is a reproduction of *A-C-B* in half plan. Now with *A-4* in the true lengths as radius and *A* in pattern as center, draw a short arc near *4* and intersect it by arc struck from *B* as center with a radius equal to *B-4* in true lengths. Draw lines in pattern from *A* to *4* to *B*.

With radii equal to *A-3, 2* and 1 in the true lengths and using *A* in pattern as center, draw short arcs near *3, 2* and 1. Set the dividers equal to the distances between 1 and *4* in the semi-circle in half plan, and starting from point *4* in pattern, step to arcs *3, 2* and 1. Draw a line from 1 to *A*. Now with the seam length 1-*A* in the half plan as radius and 1 in the pattern as center, describe a short arc near *A°* and intersect it by an arc struck from *A* as center, with a radius equal to *A-A°* in the half rectangular section in half plan. Draw lines in pattern from 1 to *A* to *A°*.

With radii equal to *B-5, 6* and *7* in the true lengths and using *B* in pattern as center draw short arcs near *5, 6* and *7*. Again set the dividers equal to the divisions between *4* and *7* in the semi-circle in half plan and starting from point *4* in the pattern step to arc *5, 6* and *7* and draw a line from *7* to *B*. Using *7-B* in the half plan (the seam length) as radius and *7* in the pattern as center draw an arc near *B°* and intersect it by an arc struck from *B* as center, with *B-B°* in the half rectangle in half plan as radius. Draw lines in the pattern from *7* to *B°* to *B*.

One Half Net Pattern

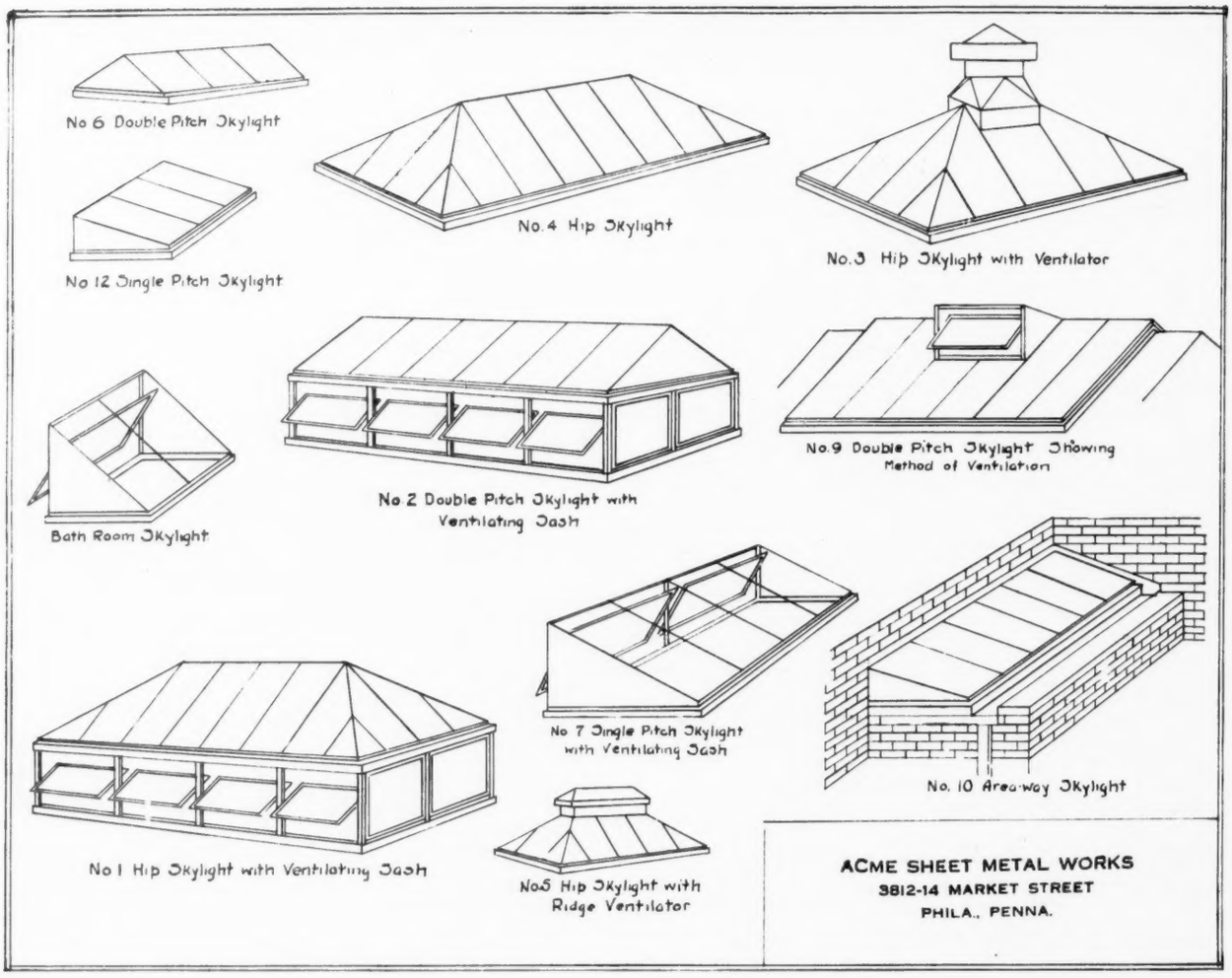
Through the points of intersections 1 to *7* in the half pattern draw the irregular line as shown. Then will 1-*7-B°-B-C-A-A°*-1 be the net one half pattern for one prong or branch of the Y. Four of these half patterns would be required to make up the two prongs.

As mentioned in the previous problems, edges must be allowed for grooving at the three seams, also for seaming to the round collars and for connection to the rectangular duct. This simplified method of triangulation can only be used, when both halves of the article, or transition, to be developed, are symmetrical.

Anthracite Stokers

(*Continued from page* 44)

regardless of the installation. On the other hand, a large part of the stack loss is recovered by radiation from the flue pipe and chimney. This is particularly true if the chimney is entirely inside the house. In this case we have assumed 60% of the heat leaving the furnace as being recovered from the flue pipe and chimney. Radiation from the casing is entirely recovered since it goes to heating the cellar and the first floor. We find, therefore, that in this example while 37% of the heat in the coal is considered lost for purposes of rating, actually only 15% loss occurs. Househeating efficiency, of course, will vary from one installation to another. The important thing to note, however, is that for every dollar spent on fuel over 80% is received in actual heat, and not the lower figure of approximately 60% as is often believed.


No 6 Double Pitch Skylight
No 12 Single Pitch Skylight
No. 4 Hip Skylight
No. 3 Hip Skylight with Ventilator
Bath Room Skylight
No 2 Double Pitch Skylight with Ventilating Sash
No. 9 Double Pitch Skylight Showing Method of Ventilation
No 7 Single Pitch Skylight with Ventilating Sash
No. 10 Areaway Skylight
No 1 Hip Skylight with Ventilating Sash
No 5 Hip Skylight with Ridge Ventilator
ACME SHEET METAL WORKS
3812-14 MARKET STREET
PHILA., PENNA.

Acme "Direct Mails" Skylights to Roofers

READERS familiar with Philadelphia know that in some ways America's third largest city is an order unto itself; it should, therefore, not be surprising to find unique practices among the contractors. For example, Philadelphia has scores of miles of "row houses" (for those not familiar, this is a block long row of houses divided one from another by a through fire wall); these mostly have flat pitched roofs and light wells and the light and ventilation demanded by city ordinance is obtained by skylights.

Hundreds of contractors in Philadelphia make their livelihood by keeping these roofs water-tight; repairing, altering, re-roofing. A very large percentage of these roofers have no sheet metal shops, nor mechanics who can do sheet metal work. But the skylights mentioned are included in their contracts with the owner. This means that the roofer must obtain the skylight needed and either erect it himself or contract erection to some sheet metal shop.

For the last eighteen years William Bork, who conducts the Acme Sheet Metal Works has taken advantage of this situation by offering to the roofers a line of standard skylights. Some of the commonest types sold are shown in the illustration of the Acme leaflet. These leaflets showing the line of skylights are mailed periodically to the roofers; also to architects and builders. The letter which accompanies the leaflet explains that these skylights have been especially developed to meet Philadelphia conditions.

Generally, these offered skylights are not stocked as standard sizes, because Mr. Bork has found that dimensions vary enough to require a few inches change in one or more dimensions. The suggestion is that the roofer pick the type of skylight needed and consult with Acme for price for a skylight assembled to the exact requirements of the installations.

Most of these skylights are constructed of galvanized iron; puttyless or puttied can be obtained for each type. Prices at which the skylights are sold depends upon actual measurements. The roofer specifies the type and requests measurements. From these the price is quoted.

William Bork specializes in designing, constructing and installing skylights for all purposes and to meet special conditions; fabricated of copper, galv. iron or any other kind of sheet metal.

IT'S THE *Favorite* SHEET EVERYWHERE!

These views, taken in leading sheet metal shops of the country, show expert craftsmen at work with SUPERIOR GALVANIZED sheets. They appreciate the advantage of using a sheet that takes a bend, roll or double seam evenly and smoothly. If it is an exacting job where appearance counts they like the "clean look" of a SUPERIOR GALVANIZED sheet.

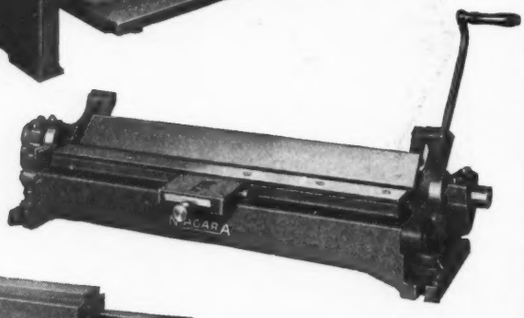
Uniformity of coating, pattern of spangle and brightness are all carefully controlled in the production of Superior sheets. These and other advantages make SUPERIOR GALVANIZED the favorite sheet among expert sheet metal workers everywhere. Distributors of SUPERIOR GALVANIZED are located in principal cities.

THE SUPERIOR SHEET STEEL CO., Canton, Ohio
Division of Continental Steel Corp., U. S. A.

SUPERIOR

OPEN HEARTH STEEL SHEETS

Sometimes "TOMORROW" NEVER COMES..



Why do some sheet metal men continue to put off "until tomorrow" the purchase of needed tools and machinery? Inevitably, this leads to a lower quality of workmanship or margin of profit. If you doubt this, just compare shop methods of a decade ago with those of today. Anywhere you look, from the small corner store to the great mills and factories, competition demands that new equipment replace old in order to cut costs and improve service.

Because a well-equipped shop is an economy rather than an expense, the OSBORN machinery department investigates the design, construction and performance of the many tools offered the trade. Serving thousands of customers, we can and do test each product far more carefully than any individual would. As a result, the class of work and the costs in the OSBORN equipped shop compare favorably with the best in the country.

OSBORN sheet metal tools and machinery include every type and size used in the industry. We will be glad to send you literature on any item in which you may be interested.

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Heating Standards of Shaker Heights, Ohio

By C. M. H. Kaercher

Managing Director, Central Bureau for Heating and Air Conditioning, Cleveland, Ohio

HOW far shall a Municipality go to insure its citizens an adequate and efficient heating plant for their homes? The City of Shaker Heights (Cleveland Ohio, suburb) has answered that question by taking complete responsibility to protect its citizens against heating jobs shaved down to a price.

Recognizing that a large percentage of building in Shaker Heights is in the hands of speculative builders and that very often the speculative builder has not too much conscience with regard to the size and adequacies of the equipment that he furnishes, Shaker Heights has established heating standards that go a step beyond anything which has heretofore been done.

Builder Must Show Heating Plan

In the operation of the Shaker Heights Code, the Building Contractor must show an *approved* heating plan before he is even given a permit to start building the house. This approval must be given by a licensed professional engineer and covers a check-up of the size of the equipment and the adequacies of the duct work.

Upon presentation of the approved plan the builder or his heating contractor is given a heating permit for an established fee which varies between $6.00 and $10.00 for residence installations according to the size of the house. This fee covers the cost of the engineering check-up, and two inspections which are made by the Building Department's own men; one after the job has been roughed in and one after the job is finished.

This procedure follows through regardless of the size or type of heating plant and regardless of whether the new building is a residence, store, apartment, or commercial building.

Foundation of the Code

The Shaker Heights regulations are based directly upon the recommendations of the Guide of The American Society of Heating and Ventilating Engineers as to sizing the equipment. On forced warm air jobs the regulations follow almost exactly the Technical Code of The National Warm Air Heating and Air Conditioning Association. On radiator jobs regulations follow the recommendations of the Heating and Piping Contractors Association. On duct work the code adopts the standards of the Cuyahoga County Sheet Metal Contractor's Association. In addition the code has several local interpretations of standard heating practice as follows:

"Computation of the heating load in Btu shall be in accordance with the heat transmission co-efficients and practices as outlined in the 16th Edition (1938) of the Heating, Ventilating and Air Conditioning Guide as published by the American Society of Heating and Ventilating Engineers, with the following modifications.

"Design temperatures shall be zero (0) degrees F. outside and seventy-two (72) degrees F. inside.

"Additional wind load shall be figured in accordance with the following schedule:

"Wind from North, West, Southwest, or Northwest, +15%.

"Wind from South, East or Northeast, +8%.

"Wind from Southeast, 0.

"All bath rooms and dressing rooms shall be figured to eighty (80) degrees F.

"For converting Btu loads to equivalent direct radiation, the Btu load shall be divided by 240 Btu for steam, 210 for Mouat or similar vapor systems, 150 for gravity hot water and 200 for forced hot water systems."

Everyone Now in Favor of Code

At first there was some opposition to the operation of the regulations. The first reaction was that the code was another restriction upon the freedom of business to operate without government supervision. But after a few months the better element in both the building contractor's ranks and in the heating contractor's ranks recognized that the regulations forced the would-be chiseler to put in a job comparable with that which the conscientious builder would normally put in and that, consequently, it made a better competitive situation for the conscientious builder.

The administration of the code has also been placed on a reasonable, rather than on an arbitrary, basis. Anyone who takes objection to the enforcement of the regulations is invited to air his views and he is given every opportunity to show that his stand is substantiated by good practice.

The net result of this heating regulation is that the buyer is practically assured of an adequate heating plant regardless of where he buys in Shaker Heights. The building contractor is assured that he can afford to figure a *good* heating plant because any competing builder will be forced to do likewise.

(*Continued on page* 86)

THE PROBLEM CORNER

Cold Starting Chimney

American Artisan:

We have used your "Problem Corner" several times when problems had us "stumped" and so far you have been very successful. Now we have a steel furnace with an auxiliary gas burner that fumes terribly—not through the casing—but because of a lack of draft. The fuming occurs when the burner starts. The only way we can start draft is to build a fire in the chimney. When the chimney is warm there is no fuming. The chimney is hardly high enough for adequate draft, but our customer does not wish to build the chimney higher because of appearances.

We have thought of placing a spinner type ventilator on the top of the chimney, but the customer wants to be so sure this will work that he suggests a motor driven ventilator. Is there such a ventilator which can be controlled by a thermostat which will stop the ventilator motor when the chimney gets warm enough to create natural draft. Will such a motor be affected by combustion fumes? Is there a ventilator with the motor outside of the ventilators? Would building the chimney above the ridge enable us to use a wind driven ventilator without motor?

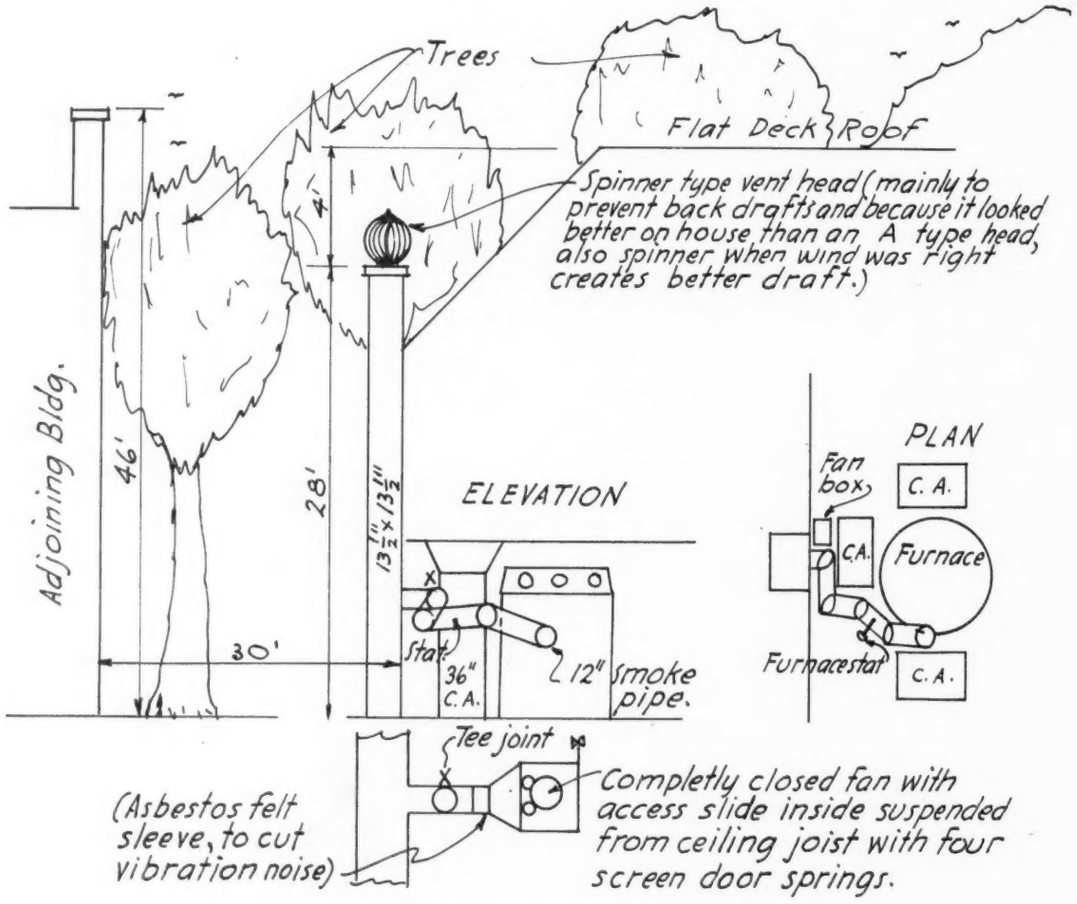
The present chimney worked fine when the customer burned anthracite coal and with a previous gas burner which had a heavy pilot flame which must have kept the chimney warm.

C. W. H., Penna.

Reply by The Editors

The Chicago Peoples Gas Light & Coke Company suggest that if you have a down draft, as well as a lack of draft in the chimney, you might find that the use of a vertical-type draft hood, similar to the gas hood on the Gas Appliance smoke pipe, but of larger size and placed on top of the chimney outdoors might prevent down draft and help your draft during the first stages of combustion.

The gas company suggests that if you are sure you do not have any down draft, then a spiral type cap should be sufficient and there probably will be no reason for the



use of a motor-driven spiral since the Gas Company, on several hundred installations, has yet to find a job requiring a motor-driven spiral.

We have asked several manufacturers of special ventilators to contact you and we presume you probably will have no trouble in selecting a cap which will serve your problem for you.

There is one additional suggestion relative to your idea of having the cap start and stop on chimney temperatures. That is to install a forced draft blower in or on the smoke pipe, which can be started and stopped on temperature and which is so constructed that draft is free flowing through the fan when the fan is idle. It would be our idea that a unit of this kind, installed in the basement out of the weather, would be much more satisfactory than trying to mount a motor on top of a chimney, and would certainly be much better appearing.

We attach a tear sheet showing a typical motor-fan unit of this type. We feel sure that you will have better success with a unit having the motor outside the pipe than you will with a unit having the motor in the combustion stream. Most motors are insulated for a 70 to 100 degree temperature rise and it is quite possible that temperatures will exceed this rating so why risk the motor?

If you will look on page 182 of our January, 1939 directory you will find a classification, "Fans, Booster, One Pipe Warm Air" which contains all the manufacturers of this type of fan.

This is how the problem was solved, American Artisan:

We have followed your suggestions and installed an induced draft fan on the smoke pipe in the basement. We first installed a fan directly in the smoke pipe (motor and fan) and the result was fine. We then installed a fan in a separate pipe and box with the fan pipe entering the smoke pipe at an angle (inducing nozzle) and connected a temperature stat to start and stop the fan. This works perfectly. Incidentally, we also sold this customer a blower-filter unit which he saw in American Artisan when we took your magazine and letter to him to read. Also, the customer had had so much trouble that he was about ready to junk his furnace and install another type of heat.

We enclose a sketch showing the furnace, chimney, smoke pipe and induced draft fan. The furnace stat starts the fan as soon as the conversion burner starts by hooking the fan into the upstairs thermostat line. When the chimney temperature reaches 200 degrees the stat stops the fan. We also control the fan so that the fan starts whenever the chimney temperature drops below 150 degrees even when the thermostat is not calling for heat because sometimes the pilot fumes become objectionable.

We discovered that the fan should be separately and entirely housed and suspended to prevent vibration reaching the smoke pipe. We also found that even a small hair dryer fan will cause draft, but is, of course, not rugged enough for this service. We also installed a spinner type ventilator on the top of the chimney and under some conditions the spinner alone accelerates the draft.

In explanation of the fan housing, we first built an open box for the fan, but the fan sucked so much basement air that it blew out the nearby gas water heater. We then enclosed the fan entirely, but until we suspended the box on soft springs the vibration was severe. We also placed an asbestos sleeve between the fan box and the Tee joint.

Since curing this problem we sold another similar fan to a customer who had excessive condensation. A manual switch controls this fan. The fan has dried up the smoke pipe and chimney in fine shape. What mystifies us is that on this furnace one heat run which never did heat satisfactorily now heats fine.

C. W. H., Penna.

Return Air from Garage

American Artisan:

We are proposing a heating system in a garage which has living quarters in one end of the building, same floor. We are concerned about taking return air from the garage because of combustion fumes. The living quarters are only temporary and the owner wants to save expense and so would like to take air from the garage if this is permissible.

G. R. B., Michigan.

Reply by The Editors

In answer to your question about heating a combination garage and living quarter, we assume you mean to heat both the garage and the living rooms by one warm air system, either gravity or mechanical circulation. If you intend to do this, then you will get your air supply either from the garage separately or the living room separately, or from a combination of both.

The above system, we believe is contrary to the regulations of the National Board of Fire Underwriters and you should get in touch with your local insurance agent and have him in turn get in touch with the Michigan State insurance department. We have a pamphlet from the National Fire Protection Association covering garages and in this pamphlet it specifically states that "garage shall be ventilated according to certain regulations and that in all cases the air required for ventilation shall be obtained from the outdoors."

Where a warm air furnace system is used, the air for heating must be taken from outdoors and no recirculation is permitted. If you follow these regulations, it means you must have one heating system for the garage and a separate heating system for the living quarters and according to the regulations there must be a fire wall between the garage and the living quarters.

The garage itself must have ventilation equivalent to 1 cu. ft. of air per minute for each square foot of floor area.

Fan motors for mechanical circulation in garages must be non-sparking type.

There may be different interpretations of the regulations in force in your community and we suggest that before you do anything with these instructions you have your or the garage's insurance man check the requirements with the Michigan Insurance Department.

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Painting Asbestos Paper

American Artisan:

On our furnace replacement work, where the old pipe is used, we generally cover the pipes with asbestos paper. We would like to paint the paper and would like to know the best material and method.

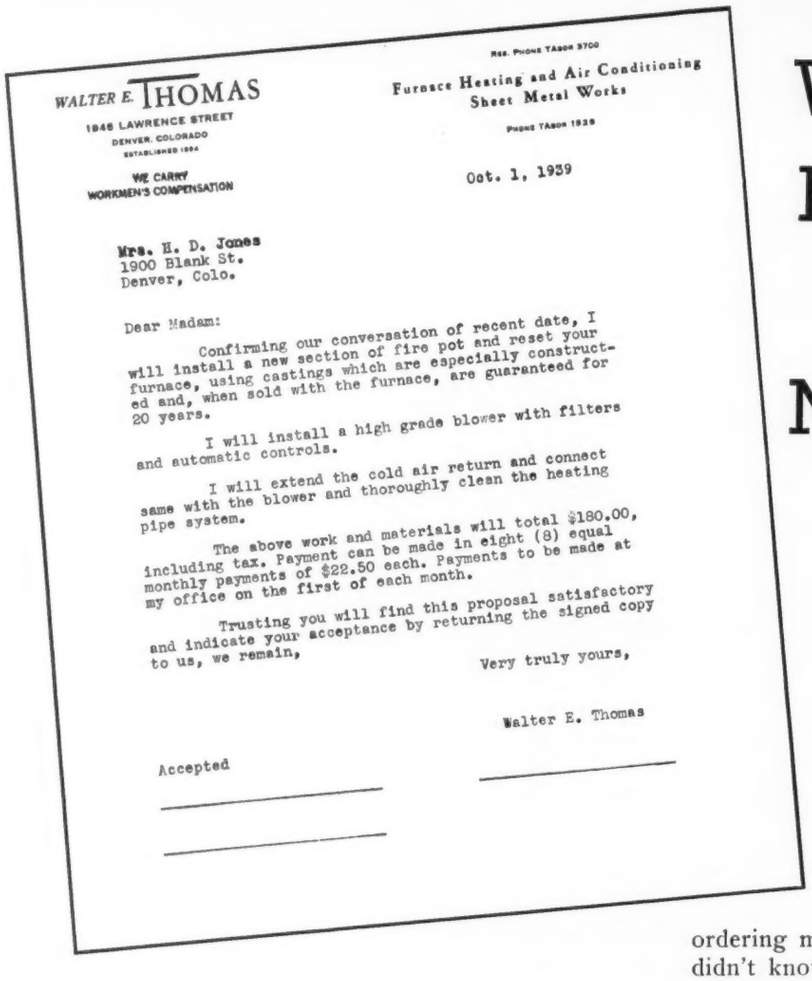
W. H. P., Georgia.

Reply by The Editors

Before we offer any suggestions on painting asbestos paper, we would like to ask why paint the old asbestos paper, because as soon as you paint asbestos paper, you destroy any insulating value it may have and painting on bare metal is much more satisfactory. You probably know that one wrapping of asbestos paper is not an insulator, but really causes a loss of more heat from the pipe than is lost with a bare pipe.

To paint asbestos paper, the paper should be brushed and glue-sized. The best material to cover the glue-size is cold water paint or so-called casein paint which is mixed with water. Next best is aluminum paint, but this is very expensive. Next to be preferred is lacquer and last of all oil paint, either inside or outside.

You probably know how absorbing asbestos paper is and it will take a lot of paint to cover any large footage of this paper.



WALTER E. THOMAS
1848 LAWRENCE STREET
DENVER, COLORADO
ESTABLISHED 1904

WE CARRY
WORKMEN'S COMPENSATION

Res. Phone TAbor 3700

Furnace Heating and Air Conditioning
Sheet Metal Works

Phone TAbor 1928

Oct. 1, 1939

Mrs. H. D. Jones
1900 Blank St.
Denver, Colo.

Dear Madam:

Confirming our conversation of recent date, I will install a new section of fire pot and reset your furnace, using castings which are especially constructed and, when sold with the furnace, are guaranteed for 20 years.

I will install a high grade blower with filters and automatic controls.

I will extend the cold air return and connect same with the blower and thoroughly clean the heating pipe system.

The above work and materials will total $180.00, including tax. Payment can be made in eight (8) equal monthly payments of $22.50 each. Payments to be made at my office on the first of each month.

Trusting you will find this proposal satisfactory and indicate your acceptance by returning the signed copy to us, we remain,

Very truly yours,

Walter E. Thomas

Accepted

Walter Thomas' Friendly Letter Is a Legal Non-Cancellable Contract

By
Wm. B. Sherrill

WALTER E. THOMAS, tinsmith and furnace contractor, Denver, has proved to his own satisfaction that squabbles over collection terms, date and amounts due, etc., are unnecessary and can be legally established without the necessity of having the customer sign a term payment contract.

"Some years ago," states Mr. Thomas, "I began to get into volume work in the fabricating and installing of sheet metal work for air conditioning jobs and warm air heating plants. Some of the work was for contractors, some of it for individuals who superintended their own installations. I began to run into trouble getting my money out of too many jobs, because my agreements were on a verbal basis. Also, there arose disputes as to the work itself; sometimes the customer vowed that I hadn't done what I had agreed to do for a certain price or, perhaps, he would say that he hadn't contracted with me for a certain part of the work. Some of the time payment contracts were hard to collect; my bookkeeping began to be real work and in the absence of a contract to pay on a certain date, payments were sometimes skipped or deferred and I had to spend a lot of time trying to collect.

"I decided, then, to get a regular contract form and have it signed by the person ordering each new job, but that didn't work out so well, either. Although people sign term contracts every day buying radios, electric refrigerators and such things, they seemed to hesitate to do the same in ordering my work. I don't know why; perhaps I didn't know how to 'hand them the pen for signing.'"

Matters were unsatisfactory when Thomas decided upon his present method. Since then, he states, there have been no disputes over the exact work to be done or when it will be paid for. In the few instances where payment isn't forthcoming upon the date due, he has only to remind the customer that he has a valid agreement which any court will support with a judgment if he asks for it.

Here is Mr. Thomas' procedure. After talking over a job with the prospect, whether he be a contractor or an individual, Mr. Thomas writes a letter addressed to the man who will order the work done. In the letter the exact work stipulated is described in reasonable detail and the terms of payment, with exact due dates and amounts, is definitely specified. If the job is to be paid for in full, upon completion, it is so stated; if it is to be paid in installments, the due dates with exact amounts are written in clearly and specifically.

At the bottom of the letter a space for signing below the wording, "Approved and Ordered Without Change" is left for the customer to sign. A carbon copy of the letter is made and delivered to the prospect with the original, with the request that he sign the copy and return to Thomas.

Thomas' signature on the original letter makes it an authentic bid for the job along with a definite statement of the work contracted for and how and when payment shall be made for it. The customer's signature on the copy is a non-cancellable order to start the work and promise to pay as specified.

Proposed Regulations and By-Laws of the New Sheet Metal, Roofing, Heating and Air Conditioning Contractors National Ass'n

A PROSPECTUS

Code of Regulations and By-Laws

Article I

NAME

SHEET METAL, ROOFING, HEATING AND AIR CONDITIONING CONTRACTORS' NATIONAL ASSOCIATION

Article II

Object

The purpose for which this Association is formed, shall be:

To represent, the Sheet Metal, Roofing, Gravity and Mechanical Warm Air Heating, Air Conditioning, Ventilating, and Allied Industries;

To promote and foster the business of its member-associations;

To reform abuses;

To strive to promote friendly relations among and between those in our Industry;

To strive for amicable and equitable relations between its members and manufacturers, jobbers and dealers in material and equipment;

To effect uniformity in trade practices;

To protect as far as possible, the Sheet Metal, Roofing, Warm Air Heating and Air Conditioning contractors of the United States from the purchasing of merchandise, equipment and materials of an inferior quality;

To approve only materials, equipment and merchandise that will give maximum service for the money invested;

To endeavor by education, to create fair competition in the industry;

To defend the industry against encroachments upon its common rights, to assist in the settlement of jurisdictional disputes, and to assist member-associations in negotiating satisfactory labor agreements whenever requested by a State, District or Local Association.

To maintain friendly relations between employers and their employees;

To assist local associations in the establishment and adoption of correct and satisfactory trade practice Codes and Ordinances;

To assist State, District and Local associations in the establishment of Sheet Metal Working and Roofing Apprenticeship classes, and/or schools;

And to do any and all acts and things necessary, convenient or expedient to accomplish all these things, and whatsoever other projects, time and customs might bring forth.

Article III

Membership

Section 1 — Active Membership: All State, District and/or Local Associations or individual contractors representing any, either or all of the industries this Association is formed to represent, shall be eligible for membership in this Association. An application properly executed shall be presented. Application for membership shall be made to the Executive Secretary. All applications shall be accompanied by the required membership fee.

Wherever a State Association maintains complete membership in this Association, no Local or Individual membership applications shall be eligible excepting thru the State Association.

Wherever a Local Association maintains complete membership in this Association, no individual applicant for membership shall be eligible in the area serviced by such Local Association.

All applications for membership shall be referred to a qualification committee composed of not more than three members for approval. This committee shall be appointed by the President.

When the application is approved, the Executive Secretary shall immediately notify the applicant of election to membership. If the application is rejected, the Executive Secretary shall immediately notify the applicant and refund the membership fee.

Section 2—Associate Membership: Manufacturers and jobbers allied with this industry may be admitted as associate members.

Article IV

Resignation and Expulsion of Members

Any State, Local or Individual member in good standing may resign from this Association in the manner herein provided. Such resignation shall be in writing and shall be addressed to the Executive Secretary, and, if such member is not in default, it shall be acted upon by the Association at the next regular meeting. The Executive Secretary shall communicate to the resigning member the acceptance or rejection by this Association of such resignation. If resignation is rejected, he shall state the reasons therefore; and if same is accepted he shall strike the member's name from the membership roll.

Failure to comply with the Code of Regulations and By-Laws of this Association shall constitute sufficient reason for expulsion of any State, Local or Individual member.

Article V

Meetings

This Association shall hold one National Convention annually. District or State Meetings may be held at such times and frequencies as the Board of Directors or the Association shall direct.

All Conventions shall be held in places most convenient, or centrally located, in each District, or in the Nation.

The National Convention shall be held in January of each year. Special or emergency meetings may be called by the Board of Directors when an emergency exists, and the purpose of such special, or emergency meeting, and the business to be transacted, shall be stated in the call letter.

The order of business for the annual convention unless changed by action of the members present, shall be as follows:

1. Disposing of minutes of the preceding meeting.
2. Reports of the Board of Directors, standing committees, and officers.
3. Reports of special committees.
4. Unfinished business.
5. New business.
6. Adjournment.

Article VI

Directors and Officers

All business of this Association not provided for in this Code of Regulations shall be conducted by a Board of Directors consisting of nine (9) members. This Board of Directors shall be elected at the first annual meeting as follows: Three members for a three year term; three for a two year term; and three for a one year term. At each annual convention thereafter, three members shall be elected to the Board of Directors, for a term of three

years. The terms of the original Board shall expire in order.

The officers of this Association shall be: a President; a Vice-President; an Executive Secretary and a Treasurer. The officers shall be elected by the Board of Directors immediately after each annual convention. They shall be elected for one year and shall hold office until their successors are elected and qualified. All officers shall be members of the Board of Directors, only, that the Executive Secretary may be selected from without the Board.

A majority of the Board members present at any regular or special meeting shall constitute a quorum for the transaction of business. A less than quorum assembly, may consider, deliberate and recommend, but shall take no action on any project, only to adjourn to a future date.

The President shall appoint a representative group consisting of twelve members, three from each of the following divisions: Sheet Metal, Roofing, Warm Air Heating and Air Conditioning, and Ventilating.

It shall be the duty of each group to investigate, as far as possible, and report their findings upon any problem which may confront their respective industries.

Article VII

Duties of Officers

The President shall preside at all conventions and meetings of the Board of Directors, and shall be ex-officio a member of all committees. He shall appoint the members of all committees. He shall perform all duties imposed by law or by order of the Board of Directors, and shall exercise all rights on behalf of the Association permitted by law and the Board of Directors. He shall perform all other duties usually performed by the President of similar organizations.

The Vice-President, shall perform the duties of the President in the event the office of the President is vacant, and in the event of his absence, inability, or refusal, to act. He shall perform such additional duties as may be imposed upon him by the Board of Directors and as are usually performed by the Vice-President of similar organizations.

The Treasurer shall perform such duties as are imposed upon him by law or by the Board of Directors. He shall be the custodian of the funds of the Association and shall perform further, all duties usually performed by the Treasurer of similar organizations.

The Executive Secretary shall perform such duties as are imposed upon him by law, or by the Board of Directors, and shall perform further all duties performed by the Executive Secretary of similar associations. He shall be ex-officio member of all committees, and shall serve as General Manager of the Association.

Any other officers, and/or employees, appointed by the Board of Directors, shall perform such duties as are imposed upon them by the Board of Directors.

Article VIII

Fees and Dues

The dues for State or local associations shall be one ($1.00) dollar per annum, per capita.

The dues for an individual membership shall be Ten ($10.00) dollars per annum.

The dues for associate memberships shall be determined by the Board of Directors.

A Finance Committee, consisting of the Treasurer, the President and the Executive Secretary, shall meet and prepare a budget for each ensuing fiscal year.

Where special service by this Association, which requires expense is rendered, this expense shall be borne by the member receiving such service.

Article IX

Services to Members

The following services may be furnished to members in good standing in this Association, subject to such terms and conditions as the Board of Directors shall deem advisable.

Investigation of Warm Air and Air Conditioning equipment, apparatus, appurtenances and material; thereby tending to elevate the standard of such materials, apparatus, appurtenances and equipment; and to discourage the installation of equipment of inferior and questionable quality and efficiency, and report results of such investigations.

Investigate Sheet Metal and Roofing Materials and products, report findings and make recommendations on quality of materials.

Investigate methods of application of Sheet Metal and Roofing, and report developments and improvements from time to time.

Affiliation through this Association with other associations or agencies as selected by the Board of Directors.

Article X

Receipts and Disbursements of Funds

All monies payable to this Association, shall be paid to its Executive Secretary, who shall issue to the payor the receipt of this Association over his signature.

All monies received by the Executive Secretary shall be delivered to the Treasurer along with an itemized statement thereof; and the Treasurer shall give the Executive Secretary his receipt therefor.

The Treasurer shall deposit all monies received by him in such bank or banks as shall be selected and approved by the Board of Directors.

The funds of this Association shall be disbursed in the following manner:

A voucher, for each bill of the Association, shall be prepared and signed by the Executive Secretary.

Said voucher shall be delivered to the Treasurer and he shall issue a check over his signature, in the amount thereof, to the person named therein.

The foregoing shall not prohibit the Board of Directors from establishing a petty cash fund, in such amount as it shall determine, which fund may be disbursed in such manner as it shall see fit.

No officer or member of this Association shall incur any liability for or on behalf of this Association, only with the approval of the Board of Directors.

Article XI

Membership Certificates

Each member shall be entitled to receive a membership certificate.

Said membership certificates shall be in such form as shall be prescribed by the Board of Directors.

Such membership certificate shall remain the property of this Association and shall be surrendered upon the termination of membership therein. Said membership certificate shall not be transferable.

Article XII

Seal

A seal of approved design may be adopted by the Board of Directors.

Parliamentary Procedure

All meetings of members, Directors and committees of this Association, shall be conducted in accordance with Roberts Rules of Order.

Article XIV

Miscellaneous

The annual Convention of this Association shall be strictly a business meeting. No State or Local Association shall be permitted to provide any entertainment, or banquet, or luncheon at any National Convention. Local or State associations, individually or collectively, shall be prohibited from soliciting funds for the entertainment of this Association.

A member in good standing, shall be a member who is not in default for the payment of any accounts, or for the

(*Continued on page* 86)

Taylor Extends National Invitation

L. R. Taylor, President of the National Warm Air Heating and Air Conditioning Association made the following statement:

"The officers of our organization are extremely anxious that the members of our Industry—and that means not only the manufacturers of furnaces but of all appurtenances and supplies used in connection with the same, jobbers and heating contractors—realize the particular importance to them of our Association's Convention which is to be held in the Hollenden Hotel, Cleveland, January 22-25, 1940, and to which all interested are cordially invited.

Every number on the program will be helpful and it is impossible for any printed reports of the meeting to take the place of a personal attendance."

President Taylor also pointed out that the Bi-ennial Exhibition of Air Conditioning Apparatus will be on during the same week in Cleveland.

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Milwaukee

An open dinner meeting of active and associate members of the Milwaukee Master Sheet Metal, Heating, Ventilating and Air Conditioning Contractors Association of Milwaukee, Wisconsin, was held in Hall 206, Alonzo Cudworth Post No. 23, 1756 North Prospect Avenue, Milwaukee, on Monday evening November 6th, with 53 present. Dinner was served at 6:45 and Maestro G. Biesen entertained with various selections on his piano-accordion. Following dinner, those present under the leadership of Maestro Biesen sang songs.

The speaker of the evening was Julius C. Jacobson, assistant chief of Income Tax Division, Collector of Internal Revenue, Milwaukee, who discoursed during the balance of the evening on all phases of the Federal income tax as it affects the members of the industry from the point of view of individuals, partnerships and corporations. He analyzed the income tax report forms, and cited comical and serious incidents which come to his attention at the Income Tax Office. He advised all to be fair and just to the government and remarked that the government wanted only what they had coming. He was greeted with applause and thanked by the president for the splendid address.

The meeting was strictly social—no business was transacted.

Paul L. Biersach, Secretary.

◆

Illinois

The 27th annual convention of the Sheet Metal Contractors Association of Illinois, will be held at the Hotel Jefferson, Peoria, January 17 and 18, 1940. Registration at 9 a. m.

J. E. Peterson, Secretary.

National

The first annual convention of the Sheet Metal, Roofing, Heating and Air Conditioning Contractors' National Association will be held at the Hotel Carter, Cleveland on January 25 and 26, following the mid-winter convention of the National Warm Air Heating and Air Conditioning Association.

Paul L. Biersach, Secretary.

◆

Sixth Heating and Ventilating Exposition

Activity in the leasing of space by exhibitors is reported for the Sixth International Heating and Ventilating Exposition which is to be held at Cleveland, Ohio, during the week of January 22 to 26, 1940.

The Heating and Ventilating Exposition—the Air Conditioning Exposition—brings together, biennially, the leading manufacturers in this field. The Exposition represents the only time and place where so great a variety of air conditioning equipment and accessories can be examined and compared. Heating, ventilating, and refrigerating engineers, technologists in every classification of industry, contractors, builders, building owners and operators, public utility executives, jobbers and dealers come to the Exposition to see what is new and to make their individual comparison of values and claims.

The Exposition is held under the auspices of the American Society of Heating and Ventilating Engineers and in conjunction with their annual meeting. The National Warm Air, Heating and Ventilating Association will also hold their national meeting at Cleveland during the same week, as will the National Association of Sheet Metal Contractors.

Exhibits will cover the entire field of manufacturing "weather" indoors.

Air conditioning is well represented with most of the leading manufacturers already located as to exhibit space. In addition to the exhibits of air conditioning units, large and small, there will be comprehensive displays representing innumerable side industries related to the air conditioning field. Included will be manufacturers of sheet metal products of every type, for instance, intake, outlet, and distribution ducts, also metal housings for the operating units.

Lakeside Hall is noted for its convenience to the business and transport centers of Cleveland. It is part of the Cleveland Civic Center and has rail facilities at its door.

Charles F. Roth, President of the International Exposition Company, will again be personally in charge. Permanent headquarters are at Grand Central Palace, New York.

◆

Chicago

The Master Furnace & Sheet Metal Contractors Association, Chicago, is having a series of talks at their meetings on coal, oil and gas heating. At the October 16 meeting, coal was the subject, while oil burning was covered at the November 6 meeting, and gas burning equipment was discussed on November 20. A. L. Nelson is secretary.

Association Activities

Chicago

An open meeting was held by the Furnace, Air Conditioning and Sheet Metal Institute at Rhineland Hall, Chicago, on November 9th. Current legislation affecting the trade was discussed.

The meeting featured the presence of F. O. Jordan, Director of Technical Education, of the Industrial Training Institute, who spoke on current educational work on night school courses now available in Chicago.

Coming Conventions

1940

Jan. 17-18—Sheet Metal Contractors Association of Illinois. 27th Annual. Hotel Jefferson, Peoria, Ill. J. E. Peterson, Secy., 20 W. Hinsdale Ave., Hinsdale.

Jan. 22-24—National Warm Air Heating and Air Conditioning Assn. Hollenden Hotel, Cleveland. Allen W. Williams, Man. Dir., 5 E. Long St., Columbus, O.

Jan. 25-26—Sheet Metal Roofing, Heating and Air Conditioning Contractors' National Association. First Annual. Hotel Carter, Cleveland. Paul L. Biersach, Secy., 225 E. Michigan St., Milwaukee.

Feb. 9-10—Sheet Metal and Warm Air Heating Contractors' Association of Indiana, Inc. Annual Convention. Union Building, Purdue University. Paul R. Jordan, Executive Secretary, 631 S. Delaware, Indianapolis, Ind.

Feb. 12-14—Master Sheet Metal, Heating, Ventilating and Air Conditioning Contractors Association, Inc., Plankinton House, Milwaukee. Exhibits. Paul L. Biersach, Secretary, 225 E. Michigan St., Milwaukee.

Mar. 25-30—Forced Warm Air Conference. Ninth Annual Short Course. Michigan State College, East Lansing, Michigan. Professor L. G. Miller, Director.

Mar. 26-27—New York State Sheet Metal, Rfg. & Air Conditioning Contr. Assn., Inc. Annual with Exhibits. Hotel Martin, Utica, N. Y. Clarence J. Meyer, Secy., 569 Genesee St., Buffalo.

National

The convention committee in charge of the January convention of the National Warm Air Heating and Air Conditioning Association—January 22, 23, 24 and 25, 1940, at the Hotel Hollenden, Cleveland—is enthusiastic over the large attendance promised and interest manifested by members and the entire industry.

In a general way, the schedule will be as follows:

Monday, January 22nd, Meeting of Board of Directors and Standing Committees.
Tuesday Morning, January 23rd, Convention Session.
Tuesday Afternoon, January 23rd, Convention Session.
Tuesday Evening, 10:00 *P. M.* to—, Deluxe Smoker under the direction of Cleveland Committee.
Wednesday Morning, January 24th, Convention Session.
Wednesday Afternoon, January 24th, Joint Session with the American Society of Heating and Ventilating Engineers.
Thursday Morning, January 25th, Special trip to the strip mill of the Republic Steel Corporation.

Program schedules will be arranged to afford ample time for visiting the Bi-ennial Exhibition of Air Conditioning Apparatus, Lakeside Hall.

Allen W. Williams, Managing Director.

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Peterson Succeeds Poe As Secretary

Ralph W. Poe, Canton, Illinois, has resigned as secretary of the Illinois Sheet Metal Contractors Association, finding it impossible to devote the time necessary to do the work required.

Convention Committee Appointed

Announcement has been made of the appointment of the following Committee from the National Warm Air Heating and Air Conditioning membership in the Cleveland District. This Committee will have in charge the entertainment features and the detail arrangements incidental to this large convention at the Hotel Hollenden, Cleveland, Ohio, January 22-25, 1940.

H. S. Sharp, Chairman, Henry Furnace & Foundry Co...Cleveland
G. G. Auer, Auer Register Company.....Cleveland
C. T. Burg, Iron Fireman Manufacturing Company.....Cleveland
George Caleb, Standard Sanitary Mfg. Company.....Cleveland
E. C. Fox, Independent Register Company.....Cleveland
R. A. Jack, American Artisan.....Cleveland
B. G. Krause, Air Controls, Inc.....Cleveland
A. W. Lehman, Viking Air Conditioning Corporation....Cleveland
C. A. Olsen, C. A. Olsen Mfg. Company.....Elyria
A. L. Rybolt, Rybolt Heater Company.....Ashland
Walter Seelbach, The Forest City Foundries Company....Cleveland
A. G. Seymour, Faultless Heater Corporation.....Cleveland
Frank Snowberg, Minneapolis-Honeywell Regulator Co.....Cleveland
C. E. Wilcox, Grant Totten Company, Inc.....Canton
Atlee Wise, Wise Furnace Company.....Akron
S. D. Yardley, Republic Steel Corporation.....Cleveland

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Toledo History

The Toledo Sheet Metal and Roofing Contractors Association Incorporated was founded in January, 1900, forty years ago next month. The word "Incorporated" was added to the original name four years ago when a non-profit charter was secured from the state of Ohio. The pioneers who founded this association forty years ago were Ernest Buettner, Fred Christen, Louis Harpst, John Gerken, Godfrey Hofer, and Henry Warnke. Mr. Buettner, Mr. Christen and Mr. Harpst are living. Mr. Buettner and Mr. Christen are still active. It is noteworthy that the

Ernest Buettner

Fred Christen

L. J. Harpst

six institutions headed by these men forty years ago are still operating. Mr. Buettner and his son Edward operate as The L. F. Burdick Company; Mr. Christen and sons Clarence, Arthur and Walter, are The Fred Christen and Sons Co.; George and Clarence Harpst operate The Hoffman & Harpst Company, founded by their father and Mr. Hoffman 50 years ago. Albert and Walter Hofer continue the G. Hofer & Sons Co.; Frank and Edward Warnke are operating as The Warnke Brothers Co.; and T. R. and J. D. Gerken, the Gerken Heating Corporation.

The present Board of Trustees are: Joe Dersher, J. Dersher Sheet Metal and Roofing; Clarence Christen, The Fred Christen & Sons Co.; Carl W. Schmidlin, The Schmidlin Brothers Heating Co.; Wesley Bueche, The Enterprise Roofing Co.; Lee B. Faunce, Faunce and Faunce; Roy Sherman, The Tolde Roofing Co.; Frank Warnke, The Warnke Brothers Company. Carl W. Schmidlin is president, Frank Warnke, vice president, Clarence Christen, treasurer, and Henry C. Bitter, secy.

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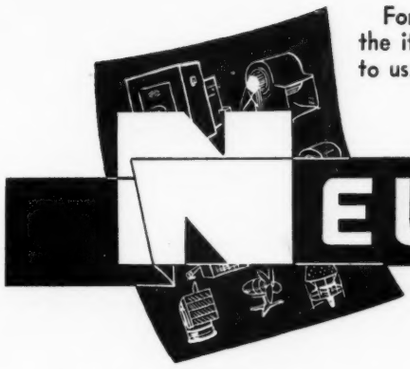
Illinois State Travelers Division

The Board of Directors of the Illinois State Travelers Division of Illinois Sheet Metal Contractors Association wishes to advise that they will assist the Illinois Sheet Metal Contractors in their Annual Convention at Peoria, January 17 and 18, by entertaining the Contractors and their ladies at dinner on Thursday evening, January 18, 1940, at 6:30 P. M. at the Jefferson Hotel.

E. A. Eishenberger, Pres.



For your convenience a number has been assigned each item. Circle the items in which you are interested on the coupon on page 92 and mail to us.

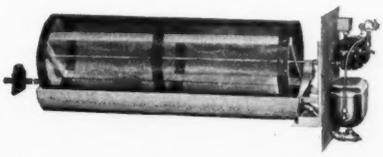
● Indicates product not listed in 1939 Directory.
△ Indicates product and manufacturer not listed in 1939 Directory.

NEW PRODUCTS

216—Electric Rotating Humidifier

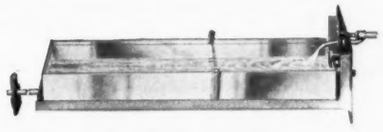
The Rudy Furnace Company, Dowagiac, Michigan, announces an electric, rotating type forced air humidifier, capable of evaporating up to 36 gallons of water daily, added to the Vaporator humidifier line.

The company also announces a fulcrum-type, floatless humidifier for



gravity furnaces, a feature of which is that its teeter-totter action settles sediment to the bottom of the pan to prevent formation of evaporation-restricting crusts on the water's surface.

The electric unit sets in the bonnet of the furnace and utilizes the motion of air, rather than temperature, to impell transfer of water into the air. A



screen cylinder is rotated at from 3 to 6 rpm, so that it picks up water from a pan and permits the moving air to sponge it up. Evaporation may be controlled, or humidifier's back-geared fractional h.p. motor is wired into furnace-stat so that the screen cylinder revolves when blower operates.

◆

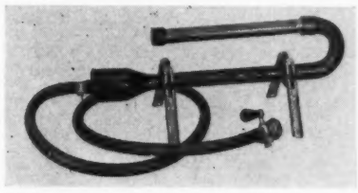
△ 217—Modern AiRegister

Modern-Aire Heating and Cooling Corp., Concord Ave. and B. & O. R. R., Wilmington, Delaware, announces modern AiRegister grilles.

An adjustable baffle with curved lip at top edge permits cold air to be drawn in from under the grille and mixed with the heated air which rises behind the baffle from the furnace, before passing through the vents in the grille. This baffle is accessible for adjustment and cleaning. A specially designated boot which comes with Modern AiRegister is available in either rectangular or round shapes, as required.

△ 218—Gantz Furnace Lighter

American Furnace Lighter Sales Company, 4541 Delmar Blvd., St. Louis, is marketing the Gantz furnace lighter for coal and coke, using gas.



The company is desirous of interesting furnace dealers, installers and repair men.

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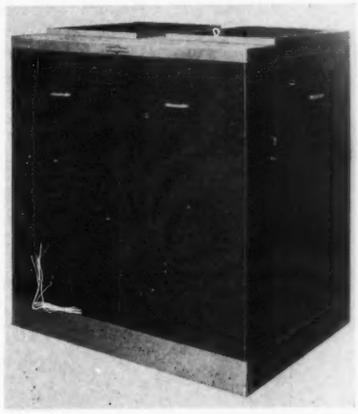
219—G-E LB-22 Conditioner

General Electric Co., Schenectady, N. Y., has recently placed on the market a new oil-fired warm air conditioner, type LB-22, with emphasis on quiet operation, abundant air circulation and humidity control. A larger and slower-speed fan, isolated from the frame by rubber mountings and can-



vas connectors, contributes to noise reduction. The motor-compressor unit is spring mounted.

Air circulation during the summer may be provided by running the fan. Cooling equipment may be installed in combination. Humidity control is improved.

The impact-expansion principle of atomization in the LB-22 breaks the oil into an extremely fine mist. The "opposed jet" construction in the combustion chamber, converging the oil and air sprays from the opposite ends of the chamber, mixes the oil and air for combustion. An oil flow stabilizer maintains a nearly constant oil rate.

△ 220—Electric Check Draft

Magnet Switch Company, Not Inc., 356 W. Huron Street, Chicago, announces an electric check draft, consisting of a pivoted aluminum check damper that is installed in the smoke pipe anywhere between the heating

plant and the chimney. Normally held open by a heavy loop of special expansion wire so as to check the fire, the passage of a small low voltage current expands the supporting wire instantly and the damper closes. When the current is turned off or in case of current failure, the check draft opens. An adjustable stop enables partial closure if desired. A hook latch holds damper in a closed position during handfiring periods.

◆

△ 221—Vibra-Seal Connection

VibraSeal Corporation, 2832 E. Grand Boulevard, Detroit, announces a new method of connecting copper, aluminum and steel tubing to pipe-threaded tapped holes. The VibraSeal is a non-metallic connection to accom-

modate a range of tube sizes from ⅛ to 2 in. O. D. In use, a threaded nipple or adapter is screwed into a threaded or tapped hole, a VibraSeal (rubber-like gasket) is placed on the tubing and a locknut used to compress or spin the VibraSeal to form a flexible seat, making a tight, leak-proof connection.

Samples are available.

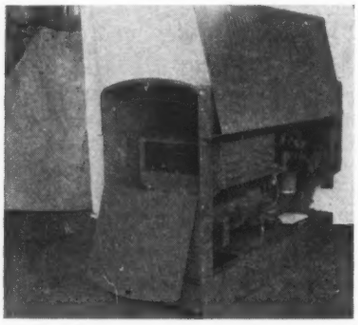
New Products . . . . . .

For your convenience in obtaining information regarding these items, use coupon on page 92.

222—SAE-200 J Arc Welder

The Lincoln Electric Company, 12818 Coit Road, Cleveland, announces a new 200-ampere engine-driven arc-welder—light weight, and small size.

The Lincoln Junior is available as a portable unit with steel-wheeled run-



ning gear, shop type and as a stationary unit, either for fixed mounting in the shop or for installation on a truck.

Continuous voltage control and current control enable the operator to select type of arc and arc intensity.

Controls are self indicating.

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△ 223—Model 70 Tempostat

D. & M. Manufacturing Co., 51 Lincoln Ave., Midland Park, N. J., has developed a new line of temperature controls—Model 70 Tempostats—low-cost thermostats of the pencil type.

Model 70L covers any desired temperature range between -50 to 350

deg. F. Model 70M covers any desired range between 150 to 650 deg. F.

Electrical ratings are: A. C.—1250 watts at 110 to 440 volts, non-inductive loads. Inductive loads up to ½ h. p. at 110 volts. D. C.—250 watts at 110 volts.

Overall dimensions of the operating head are 4x2x2 in. Immersion tube diameter is ½ to ¾ in.

▲ 224—A. C. Furnaces

Palmer's Manufacturing Corp., Phoenix, Ariz., has developed a new line of forced air furnaces. The heating element is concentrated by corru-

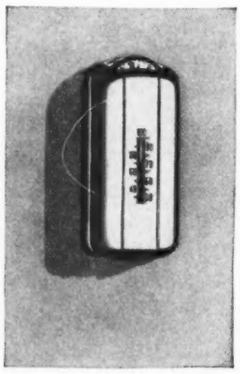
gation, so that the furnace will fit into a small closet on the main floor of the average home, or may be placed in a basement.

The furnaces are made in sizes of from 50,000 to 600,000 Btu capacity, equipped with a blower and filter.

◆

● 225—Comfort Dial Thermostat

General Electric Company, 1 River Road, Schenectady, N. Y., offers a new line of thermostats for heating and cooling service, featuring an external adjustment called the "Comfort Dial" in addition to a conventional-

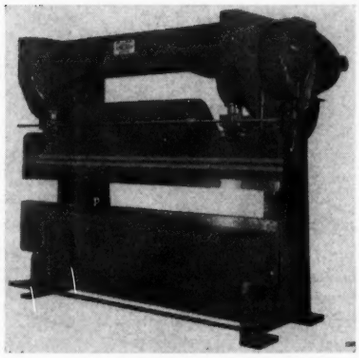


type temperature adjusting dial.

By means of the Comfort Dial, the home owner can manually alter the pre-heat setting of the thermostat.

The enclosure is a streamlined molded plastics case, available in either an antique ivory or silver-bronze finish. Night "set-back" is provided by a heating resistor within the thermostat—five or ten-degree set-back can be furnished. An Alnico magnet provides snap action.

The new thermostat can be supplied either for low- or high-powered service.



226—Press Brake

Dreis & Krump Manufacturing Company, 7404 S. Loomis Blvd., Chicago, announces a new design in press brakes for bending, forming, and punching sheet metal. New features embody streamlined design with all gears and working parts enclosed and running in oil, and a new type cushioned friction clutch.

Housings, ram, bed, and all main members are constructed of steel plate. Power is delivered to the ram at both ends. Main bull gears and eccentrics are one piece. Double back gearing gives reserve power. Adjusting screws are encased in sleeve-like plungers and operate in a vertical non-oscillating position throughout the stroke. The friction clutch has one moving part. Brake is combined with clutch and operates by a simple direct movement. Variable speed drive operates the ram at any speed from 15 to 45 strokes per minute.

Machine is made in three sizes, to bend ⅜ in. plate 4 ft. long and up to 14 gauge sheets 10 ft. long. The stroke is 2½ in., adjustment of ram 3 in., and die space 6½ in.

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227—Hand Aspirated Psychrometer

Julien P. Friez & Sons, Div. of Bendix Aviation Corp., 4 N. Central Ave., Baltimore, offers a hand aspirated psychrometer for which patents were recently granted. Typical air at the correct velocity is induced over the

thermometer bulbs by the use of the hand pump while the operator holds the instrument stationary and watches the wet bulb reading move down to finality.

The thermometers are shielded against radiation errors, and with the molded combination case-handle folded the instrument fits the pocket.

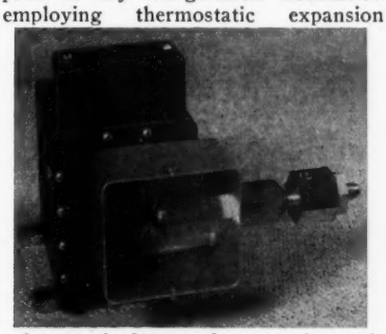
New Products . . . . . .

For your convenience in obtaining information regarding these items, use coupon on page 92.

228—Modutron System

Minneapolis-Honeywell Regulator Company, Minneapolis, has developed the Modutron control system for modulating the refrigerating liquid flow to give the best comfort results from the point of view of both temperature and relative humidity.

The Modutron system may be applied to any refrigeration installation employing thermostatic expansion



valves and the usual external equalizer. A small electrically operated valve, known as the V543 Modutron, is installed in the equalizer line of the thermostatic expansion valve. The electric motor which operates the valve is modulated by temperature, humidity, pressure or any other condition to be controlled and opens the valve wide when maximum cooling is required. If less refrigerating effect is required, the electric motor moves the valve to a more closed position, reducing the effect of the external equalizer on the expansion valve.

On jobs requiring further reduction of capacity, the W58 orifice may be added.

The Modutron may be added to existing systems since only the ¼ in. equalizer line need usually be disturbed.

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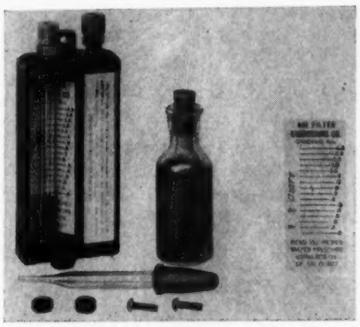
▲229—Air Filter Indicator

Air Filter Engineering Co., 2236 S. Wabash Avenue, Chicago, announces the air filter indicator, reading the



static resistance across a bank of air filters, or to indicate low-range pressure drops.

The body of the indicator is an aluminum alloy casting, finished in a Krinkled black enamel. A heavy ground capillary tube is seated in Neoprene sealing gaskets and protected on three sides by the walls of the unit. The black etched frosted aluminum scale is calibrated to read from 0 to 1½ inches of water pressure.

Operating instructions are on the side of the indicator face. A bottle of red indicator oil and an eye dropper are included.

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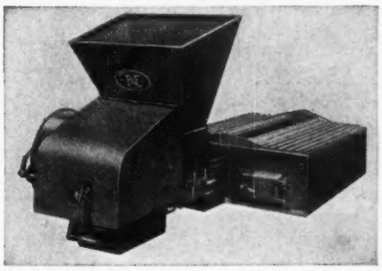
230—Commercial Stoker

The Flynn & Emrich Company, 301 Holliday St., Baltimore, is now in production on their "F & E" Series 40 underfeed stokers, adaptable to either



bituminous or anthracite coal. The Series 40 is a ram feed stoker, powered by the "F & E" unit type electro hydraulic drive. It has synchronized coal feed and air control to adjust "carburetion" at all coal feeding rates.

A fuel bed regulator regulates the fuel bed while the fire is burning, in the event of a change in size or quality of coal.

The tuyeres, or grate burning surfaces, are specially designed and made of high-test, heat-resisting materials. The mechanism and ram are protected from damage by foreign matter in the coal by the Ram Safety Feature—a method that completely stops operation of the ram and permits removal of the obstruction through a door in the ram case.

A new feature, the Removable Ram Case Liner, provides an opportunity to replace at low cost and minimum effort, a part subject to most wear.

Completely automatic controls are furnished as standard equipment, with special controls available at additional cost.

A bin-feed device can be furnished.

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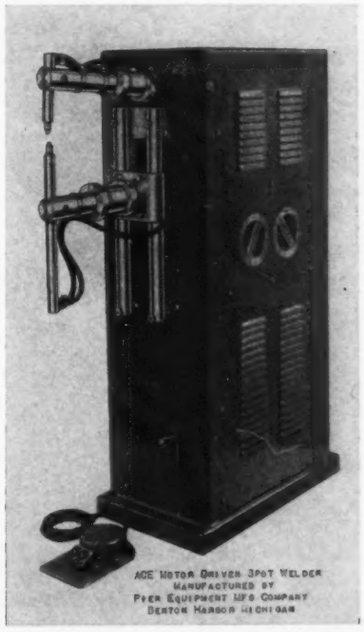
● 231—Window Stripping

The B. F. Goodrich Co., Akron, Ohio, has developed an extruded rubber strip for casement windows where air conditioning equipment is to be installed.

Low content of free sulphur in the new rubber strip provides a minimum tendency to tarnish bronze and brass.



232—50 KW Spot Welders

Pier Equipment Mfg. Co., Milton & Cross Streets, Benton Harbor, Michigan, has added two new models to the line of Ace spot welders used for spot or projection welding, and, with suitable fixtures, for butt welding. Both are 50 KW size, one motor-driven automatically-operated (illustrated), and one manually-operated by means of a new swivel-jointed foot treadle Both have added refinements, such as new recessed automatic trip control and timing adjustment. An 8-point heat regulating switch for adjusting secondary voltages and current, is furnished, and a new longer-life 300 Ampere Contactor. Four throat depths are available and lower horn may be adjusted to provide spacing up to 15 in. on standard welders. The transformers are designed regularly for operation on 220 volt, 60 cycle supply.

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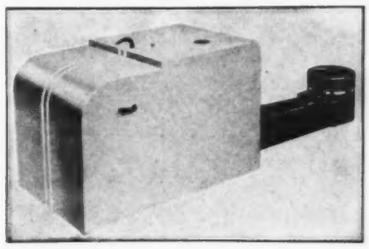
▲233—Stokerator DeLuxe 30

Northern Steel & Stoker Corp., Peoria, Illinois, announces that production on their complete line of



Stokerator Stokers has started, and deliveries to distributors are being made.

"Stokerator DeLuxe 30," said A. J. Folkorts, "is a full size, **30 pound,** stoker built to retail at a low price."

Stokerator Stokers are made in sizes and capacities for all domestic and commercial requirements.

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Ninth Annual Short Course

School Plans for Furnace Dealers and Heating Contractors

"Make it practical" will be the theme song of the Ninth Annual Forced Warm Air Conference at Michigan State College the last week in March, to be held as usual under the auspices and guidance of the National Warm Air Heating and Air Conditioning Association. Every step in the program is being carefully planned with one idea in mind—to give the furnace dealer or heating contractor definite help in all phases of his job; to help him sell more furnaces, more complete installations, and more improvements or added equipment for existing installations; to help him to design, calculate and install every job he sells in a way that will produce a pleased customer; and so to help him build up his business and make more money.

Particular care will be given to the presentation of simple, practical and thoroughly helpful methods in design and calculation work. The papers, problems and discussions on this topic will be especially planned to be useful to the small dealer or contractor who lacks elaborate facilities or a large staff. Professor Lorin G. Miller, head of the Department of Mechanical Engineering at Michigan State College, says "We aim to make the material we present valuable enough to repay any dealer many times over for the cost of a trip to East Lansing, no matter how small his business may be and no matter how far away."

R. M. Wallis, Chief Engineer of the Meyer Furnace Company, Peoria, will be in charge of the small residence heating section, assisted by Frederick Bishop of Detroit, Guy Voorhees of the Furblo Company, Hermansville, Michigan, and Bruce McLouth of Dail Steel Products Company, Lansing.

The large residence air conditioning section will be under the supervision of Gilbert Denges of the Williamson Heater Company, Cincinnati, assisted by Earl Maynard of the Fox Furnace Company, Elyria, and Edward Root of the Nelson Company of Detroit.

Walter Schlighting of the Clarage Fan Company will direct the class in summer cooling, which will have as a practical demonstration problem the actual design and installation of a small theater plant.

The complete program of the Conference will be announced at the mid-winter convention of the National Warm Heating and Air Conditioning Association, to be held in Cleveland January 22nd, 23rd and 24th, 1940.

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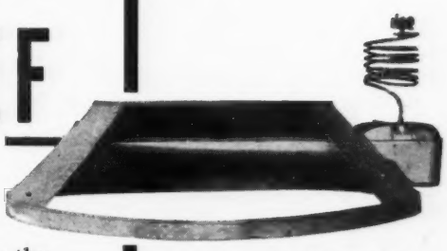

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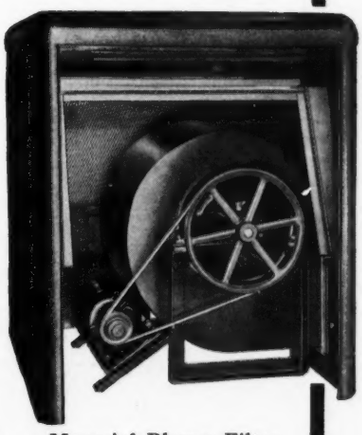

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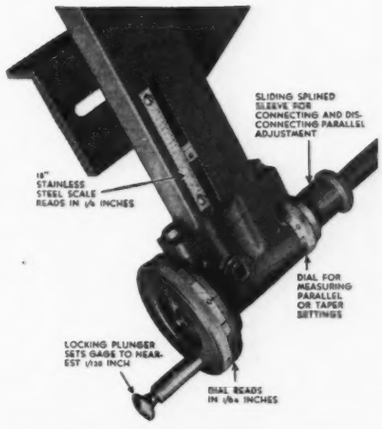
NEW BALL BEARING, SELF-MEASURING PARALLEL BACK GAGE


SLIDING SPLINED SLEEVE FOR CONNECTING AND DISCONNECTING PARALLEL ADJUSTMENT
18" STAINLESS STEEL SCALE READS IN 1/64 INCHES
DIAL FOR MEASURING PARALLEL OR TAPER SETTINGS
LOCKING PLUNGER SETS GAGE TO NEAREST 1/128 INCH
DIAL READS IN 1/64th INCHES

Easy foot operation
Strong, rigid bed
Self-locking holddown
Triangular Section Crosshead
Capacity, 18 gage

Write for Bulletin 80-C

Now Standard Equipment on Niagara 196″ and 1120″ Foot Operated Shears

This new Niagara ball bearing, parallel back gage is extremely quick, accurate and easy to adjust. It is self-measuring to increments of 1/128 inch.

Gage can be rapidly adjusted for taper cutting by disengaging the internally splined sleeve on connecting shaft.

The gage bar is exceptionally rugged. A truss rod stiffens the gage bar and provides an adjustment for maintaining straightness after long, hard usage.

NIAGARA MACHINE & TOOL WORKS

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Branches: Cleveland Detroit New York

Your Register, Sir-

IN A NEAT, FLAT STORABLE PACKAGE

All standard Tuttle & Bailey Registers, Intakes and the new completely interchangeable installation frames now come to you in a new flat, attractive and STORABLE individual carton. The packages go far toward simplification of your warehousing problem. The label on each carton carries a complete and instantly understandable description of the contents. The cartons prevent deterioration of the goods and are easily and quickly inventoried when stacked. Their use facilitates the prompt filling of orders with accuracy and minimizes the danger of damage in delivery on the job.

HAVE YOU SEEN CATALOG No. 39A?

Describes and details the new Adjustiblade Register which makes upward, downward or horizontal deflection of the air stream a matter of moments only, and the new completely interchangeable installation frames. Send for a copy today.

T & B

TUTTLE & BAILEY INC.

NEW BRITAIN, CONN.

BOSTON NEW YORK PHILADELPHIA CHICAGO

Konzo, Controls For Two-Speed Fans

(*Continued from page* 31)

outdoor differences less than 45 deg. F, very little difference in the fuel consumption resulted with the two methods of operations. For colder weather, or for indoor-outdoor differences greater than 45 deg. F, the fuel consumption with the two-speed operation was slightly less than that with single-speed intermittent operation. This reduction in fuel consumption varied from 3 per cent to 8 per cent for indoor-outdoor differences varying from 50 deg. F. to 65 deg. F.

The reduction in fuel consumption obtained with lower fan speeds cannot be attributed to higher bonnet efficiencies maintained during the periods of burner operation. However, as may be noted from Fig. 4, the flue losses during the off-period of the burner were apparently lower with the two-speed fan than they were with the single-speed fan. In the latter case the fan was stopped at the same time that the burner was stopped, and the reserve heat in the furnace tended to raise the temperature of the air in the bonnet. However, in the case of the two-speed fan, the fan continued to operate for some time after the burner had stopped and the residual heat in the furnace was completely transferred from the bonnet to the rooms. Since the speed of the fan was low and the amount of residual heat was limited, the temperature overrun that accompanied these comparatively long periods of fan operation after the room was satisfied was not of sufficient consequence to be objectionable.

B. Burner Operation

With two-speed fan operation the number of cycles of operation was materially less than that with single-speed fan operation. For an average winter day the burner operated 78 times with the two-speed fan control and 118 times with the single speed fan control. The electrical input to the burner motors was approximately the same for the two cases.

C. Fan Operation

TABLE 2

Data on Operation of Two Speed Fan

Indoor-Outdoor Temp. Difference in deg. F.	Total Fan Operation in hours		Increase in Running Time of Two-speed Fan Operation over Single-speed Operation, %
	Single-Speed	Two-Speed	
20	3.9	7.3	87
40	7.8	14.2	82
60	12.0	20.6	72

As shown in Table 2 the total running time accompanying two-speed operation was approximately 80 per cent greater than that for single-speed operation of the fan. In fact, for an indoor-outdoor temperature difference of 60 deg. F the fan operated 20.6 hours out of 24, or 86 per cent of the time, when the two-speed arrangement was used.

Total electrical input with the two-speed fan op-

RYBOLT

THE FURNACE OF TODAY

It's CORRUGATED

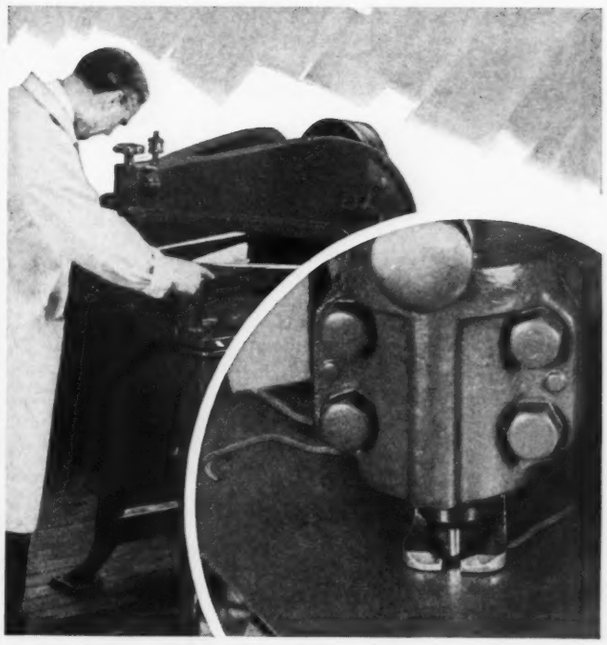
A Special RYBOLT Feature with a Triple Advantage

● A special feature of the RYBOLT Cast Iron Furnace, Series 15, is represented by the corrugated sections forming the fire bowl and combustion chamber. Corrugated both inside and out to form a wall of even thickness this construction has three distinct advantages.

First, it gives more heating surface in corresponding space. Second, it provides better combustion because of the air space between these corrugations which keep the fuel from packing tightly against the sides. Third, it gives greater strength and longer life to the furnace. Write today for more information on this and many other advanced RYBOLT features.

READY NOW! *A series of business-building newspaper ads for dealers. Mats or electros FREE. Write for proof sheet.*

THE RYBOLT HEATER CO.
615 Miller Street · Ashland, Ohio



Cutting Costs down 20% to 80% with a CAMPBELL NIBBLER

● The Campbell Nibbler often reduces the time of cutting irregular shapes in steel or other sheet metals to one-half or one-fifth of what it was. Sheets up to one-half inch thick are actually cut at savings up to 80%.

In addition the Campbell Nibbler does a *better* cutting job. No burrs are left on the cut edges. Little or no finishing is needed. There is no case hardening or distortion of the material. There are no strains or microscopic fractures.

BUY ACCO QUALITY *in Campbell Cutting Machines; Wright Hoists, Cranes and Trolleys; Page Welding Electrodes; American Chains; Tru-Lay Preformed Wire Rope; Reading-Pratt & Cady Valves; Page Wire Fence.*

ANDREW C. CAMPBELL DIVISION
DESIGNERS AND BUILDERS OF SPECIAL MACHINERY
BRIDGEPORT, CONNECTICUT

ACCO TRADE MARK

AMERICAN CHAIN & CABLE COMPANY, Inc.
In Business for Your Safety

A COMPLETE LINE OF PILLOW BLOCKS

Randall One-Piece Steel Housing Pillow Block showing vibration-isolating rubber grommets.

Randall Universal Pillow Block

Randall Standard Pillow Block

Quiet

Durable

Economical

Engineers and manufacturers recognize Randall Pillow Blocks for their extra years of economical trouble-free service with a minimum of attention. They are unusually quiet, self-lubricating and self aligning. Randall Pillow Blocks are your assurance of efficient bearing operation.

Write today for catalog describing the complete line of Randall bearings.

Representatives carrying stocks

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Salt Lake City, Utah

Randall

RANDALL GRAPHITE PRODUCTS CORP.
Dept. 1211 609 W. Lake St., Chicago, Ill.

eration was from 9 to 21 per cent greater than that for single-speed operation, depending upon the severity of the weather, with an average value of approximately 15 per cent.

In general, when the costs for fuel, for burner power, and for fan power are all taken into consideration, the total daily operating costs for the two methods of operation may be considered as practically the same.

D. Temperature Differential in Rooms

On the average, the temperature of the air near the floor with two-speed fan operation was approximately 0.4 deg. F. higher than that obtained with single-speed operation.

E. Off-Period of Fan

The comfort conditions in the room were markedly improved with the two-speed operation of the fan. In general, the conditions of discomfort occurred only during the off-periods of the fan. Obviously, improvements in the room comfort conditions could be effected by a reduction in the number of off-periods, in a reduction in the average duration of the off-period, or in a reduction in both factors. The number of off-periods per day as shown in the upper part of Fig. 5 was much smaller for

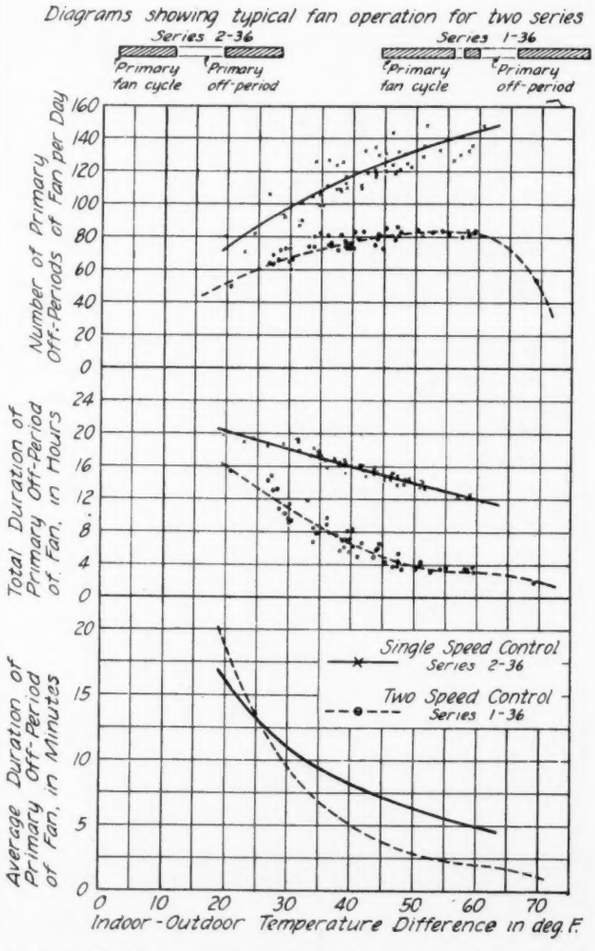
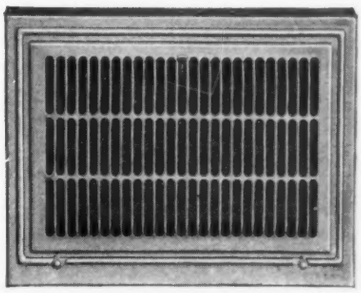

Diagrams showing typical fan operation for two series
Series 2-36
Primary fan cycle
Primary off-period
Series 1-36
Primary fan cycle
Primary off-period
Number of Primary Off-Periods of Fan per Day
Total Duration of Primary Off-Period of Fan, in Hours
Average Duration of Primary Off-Period of Fan, in Minutes
Single Speed Control Series 2-36
Two Speed Control Series 1-36
Indoor-Outdoor Temperature Difference in deg. F.

Fig. 5—Number of off-periods and duration of off-periods of the fan with two-speed and single-speed fan operation.

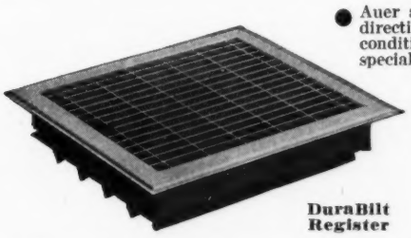
A Full Line of MODERN Gravity Registers

The uniformly fine quality of Auer Gravity Heating Registers has for many years placed them high in the estimation of the heating trade and of architects and interior decorators. Pleasing design is carried through the entire line, which includes models for all purposes, and faces and finishes to harmonize with any interior scheme. Abundant strength, generous open area, easy installation characterize all Auer Registers. Specify genuine Auer Registers for your warm air jobs.

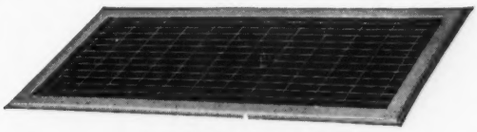


600 Elite (face removable without tools)

● Auer also manufactures a complete line of correctly designed air directional and adjustable registers and intakes for modern air conditioning, and a variety of grille faces for all standard and special requirements. Ask for complete Auer Register Book No. 39.



DuraBilt Register



DuraBilt Cold Air Face

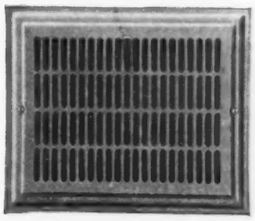
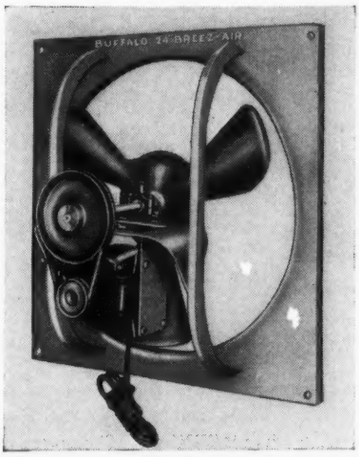


Fig. CB Deflecting Wall Register

THE AUER REGISTER COMPANY, 3608 PAYNE AVENUE, CLEVELAND, OHIO

AUER DISTINCTIVE REGISTERS & GRILLES For Air Conditioning *and* Gravity

Here's THE Fan to Use



For Your Simpler Store and Shop Ventilating Jobs

The new Buffalo "Beltair" Fans are solving the ventilating problems of stores, shops, restaurants, etc., where no special duct work is required. Engineered with the traditional "Buffalo" skill and knowledge of correct fan design, these low cost fans will give your customers many years of quiet, efficient, trouble-free service. 5 sizes from 24" at 4000 c. f. m. to 48" at 17,000 c. f. m. Prompt shipments from stock.

BUFFALO FORGE COMPANY

497 Broadway Buffalo, N. Y.

Branch Engineering Offices in Principal Cities
Canadian Blower & Forge Co., Ltd., Kitchener, Ont.

two-speed fan operation than it was for single-speed fan operation. For example, for an indoor-outdoor temperature difference of 60 deg. F, the numbers of off-periods were 82 and 145 respectively, for two-speed and single-speed operation.

Heat Supply Move Nearly Continuous

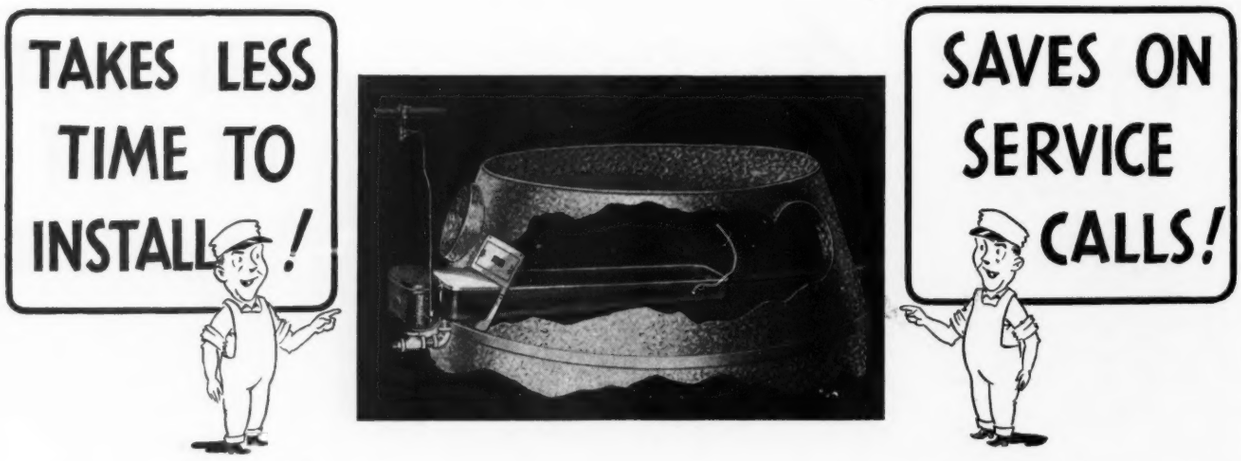
The lower pair of curves in Fig. 5 shows the average duration of the off-period of the fan. Obviously when the off-periods are long, the room temperatures have a long period in which to decrease, and the possibilities of obtaining temperatures less than the desired value become great. For an indoor-outdoor temperature difference of 60 deg. F, the average durations of the off-periods were 3 min. and 5 min. respectively, for two-speed and single-speed operation. Hence, from the standpoint of fewer number of off-periods per day and also from that of shorter duration for each off-period, it may be concluded that the heat supply to the rooms was more nearly continuous and that conditions were more favorable in the case of two-speed fan operation than in the case of single-speed operation.

Summary of Test Results

The use of a two-speed fan, that operates at low speed during the greater portion of the heating season and at high speed during heavy heating demands only, requires a more expensive motor and a more complicated control system than is required for the simpler single-speed fan operated intermittently. The total operating costs, including those for oil fuel, and for power consumed by the burner motor and fan motor, were approximately the same with both methods of fan operation. In the case of the two-speed fan, however, the fan was operated a greater proportion of the day, the total number of the primary off-periods of the fan was decreased, and the average duration of the off-periods of the fan was diminished. Furthermore, the temperature conditions in the rooms were improved.

The temperature and comfort conditions in the second story rooms, which were entirely satisfactory with single-speed fan operation, were not changed when a two-speed fan was used. In the first story rooms, not only did the two-speed operation tend to increase the magnitude of the temperatures in the living zone, but it decreased the temperature fluctuation during each fan cycle. These improvements in the comfort conditions, consisting not only of a substantial reduction in the number and lengths of off-periods of the fan per day, but also of a noticeable improvement in the variations in the air temperature in first story rooms, are such that the use of a two-speed fan should be given consideration in the application of forced-air heating to small and medium sized installations. The accompanying factors of quiet operation and more moderate air movement in the rooms may also be considered as advantageous features.

[To be continued]



DEALERS everywhere recognize the superiority of Skuttle automatic humidifiers: (1) Because they are quickly and easily inserted in the bonnet or plenum chamber of any warm air furnace, they save time and money on insulation. (2) Because they are trouble free in operation, expensive service calls are eliminated. (3) Because they are constructed of the best materials, each unit gives many years of service. (4) And because J. L. Skuttle Company has manufactured humidifiers for 22 years and has always dealt fairly with its dealers, it has won an enviable reputation among humidifier manufacturers throughout the country.

After reading these features, it is needless for us to say that the automatic humidifier will boost your profits if you give them the chance. If you want to convince yourself of their superiority, order one today and try it out to prove what it can do.

Yes, their prices are the lowest, so that you can sell the small home market, which is the volume market today. Don't wait, find out about the Skuttle automatic humidifiers right now.

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J. L. SKUTTLE COMPANY — AUTOMATIC HUMIDIFIERS — 999 FRANKLIN ST., DETROIT, MICH.

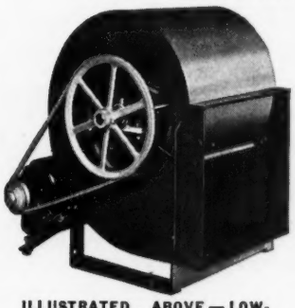
50%

OF ALL MANUFACTURERS of Domestic Air Conditioning Equipment Use

LAU Parts!

. . . It's one of the reasons why we've doubled our factory capacity in the past year . . . why we've moved into a new and larger plant. Behind all this lies the outstanding superiority of LAU Equipment . . . the efficiency and dependability with which it meets the most exacting demands of your customers. The complete adaptability of Lau Equipment to the job you have at hand or in mind can be relied upon by you with full confidence in its advanced design and precision workmanship.

INSURE YOUR PROFITS; USE LAU PARTS



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Variable speed drive. Automatic belt-tightening device. Automatic cut-out on motor. Rubber cushioned. Top, side, or rear motor mounting. 22 sizes.

Lau precision built Pillow Blocks, side corner mouldings, top mouldings, and corners as well as variable and constant speed pulleys, blower wheels and furnace blower assemblies give you trouble free assembly, service free installations, compact and modern jobs that assure profit and lasting customer satisfaction.

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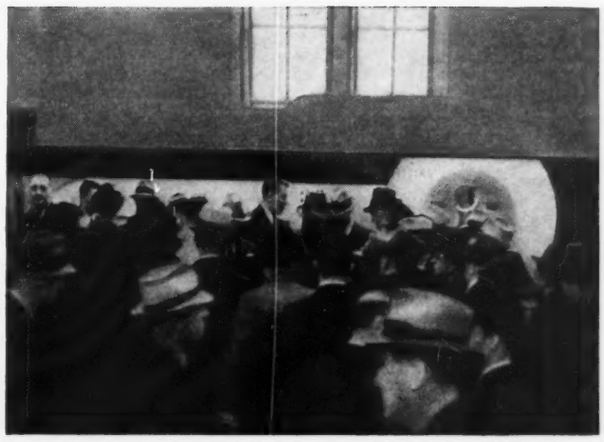

They wouldn't miss it

THEY know they couldn't spend a week to better advantage. Their business progress depends on knowing what's new and good in heating, ventilating, air conditioning. The sheet metal industry cannot afford to overlook these great advances.

Over thirty thousand visitors to the International Heating & Ventilating Exposition will learn what more than three hundred exhibitors have perfected for modern installations. They'll see these products with their own eyes, watch demonstrations, make comparisons, ask questions, get useful answers, meet and make friends. Of course they wouldn't miss this outstanding biennial exposition.

Note the date and be there too. Admission is by registration. You are cordially invited to attend.

6th INTERNATIONAL HEATING & VENTILATING EXPOSITION
The Air Conditioning Exposition
LAKESIDE HALL, CLEVELAND, OHIO
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Management, International Exposition Co.

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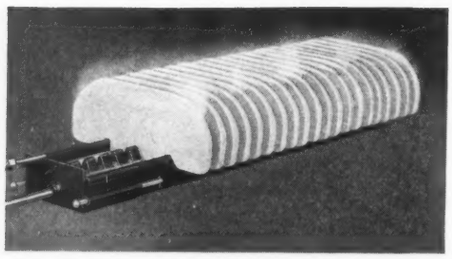
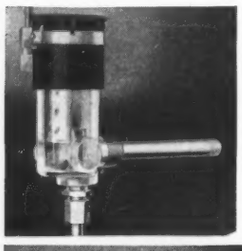


Whatever You Want In Humidification — Monmouth Has It!

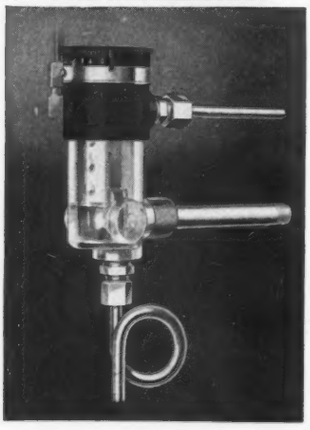
Starting with the powerful, compact vapor diffuser as the basis, Monmouth, with its complete line of controls, can assemble *exactly* the systems you want. The inexpensive Micro-feed is fully automatic with direct control. The popular Flotrol is the first completely dependable float-control. The Humidigrad is not only completely automatic with direct or room control, but includes every modern scientific device known to humidification.

You can make more money selling *engineered humidity.*



MICRO-FEED — a dependable, low-cost automatic feed control for gravity heating systems. Produces automatically graduated humidity regardless of outside temperatures.

FLOTROL — the first genuinely scientific float control ever developed selling at a price that fits most competitive units. Operation is automatic except during very severe weather when hand adjustment is required.



HUMIDIGRAD — the last word in scientific automatically graduated humidity control. Includes filter and pressure governor.

We will welcome the opportunity of sending complete information and prices to any interested manufacturer, jobber, or dealer.

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1933 E. 61st., Cleveland, O.

MONMOUTH
The Greatest Name in Humidification

Shaker Heights Heating Code

(*Continued from page* 63)

The heating contractor knows that he can figure a good job because no other kind of job will be permitted to go in.

Other Suburbs Following Shaker's Lead

So successful has been the operation of this code that surrounding municipalities are being urged by the better builders and architects to enact similar regulations. Unquestionably a big factor in having the regulations acceptable to everyone has been the fair, non-political and efficient administration by the Shaker Heights Building Department. In larger municipalities, where the political element might creep into the administration, a similar set of regulations might not be so satisfactory. However, it is pleasant to record at least this one instance where a municipality is interested not only in its reputation as one of the finest residential areas in the country, but also as a place where the building industry is completely free of undesirable practices through the vigilance of its City Council operating through the Building Department.

◆

New Sheet Metal Contractors Ass'n

(*Continued from page* 68)

compliance with any orders of the officers or Board of Directors.

No member, who is not in good standing, shall be entitled to any of the benefits or privileges of membership in this Association.

This Code of Regulations provides for District or Regional meetings. This provision is intended for use whenever, in the opinion of the Board of Directors, the Association membership has grown sufficiently, or covers a sufficient area, to warrant the establishment of Districts or Regions.

The Executive Secretary and the Treasurer shall give bond in such form, and in such an amount, as may be determined by the Board of Directors.

Article XV
Amendments

This Code of Regulations may be amended at any regularly called Convention, provided that the proposed amendment shall have been submitted in writing to the members thirty days prior to the meeting, at which action shall be taken thereon

◆

Stokers in St. Louis

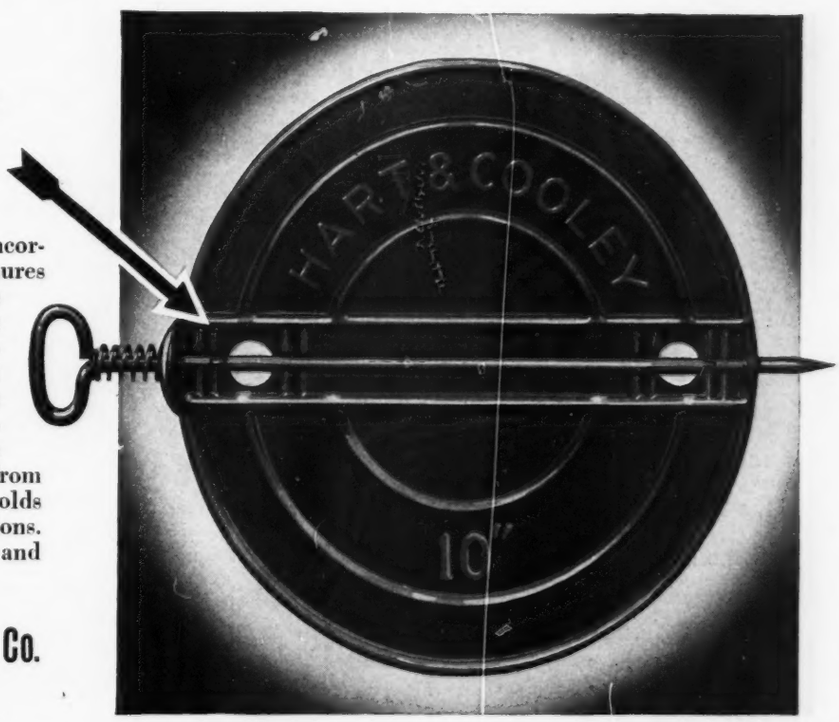
The St. Louis Division of Smoke Regulation reports that installations of stokers in the City of St. Louis in October of this year established a new high record, or at least since the establishment of the present Smoke Department in October of 1937.

St. Louis October stoker sales reached 544 units of all sizes.

The St. Louis Smoke Department further reports that since October 1937 to and including October of 1939 there have been 4,449 stokers installed including 3,438 household size machines and 1,011 commercial and industrial machines.

The Greatly Strengthened H & C DAMPER

This EXTRA EMBOSSING DOES IT



This extra heavy embossing, now incorporated in all H & C Dampers, assures ample strength where strength is most needed. No matter how tight the damper fits in the pipe the spindle cannot become loosened; if you turn the spindle the damper must turn with it. You pay nothing extra for this added strength. Spindle is reversible—may be inserted from either end. The heavy spring holds damper securely under all conditions. Standardize on H & C Dampers and avoid expensive replacements.

HART & COOLEY MANUFACTURING CO.
HOLLAND, MICHIGAN
Chicago Office at 61 W. Kinzie Street

New Literature . . . .

For your convenience in obtaining copies of new Literature use the coupon on page 92.

263—Arc Welding Electrode Specifications

The McKay Company, McKay Building, Pittsburgh, has just published a small 24-page catalog with tentative specifications for iron and steel arc-welding electrodes approved by both the American Welding Society and the American Society for Testing Materials, along with other useful material.

Advice as to proper discrimination among different mild-steel electrodes, according to the nature and conditions of the work, is given in charts and comparisons.

◆

264—Armco Duct Calculator

The American Rolling Mill Co., Middletown, Ohio, is distributing a duct calculator designed to accurately and quickly figure duct sizes, after the engineer or contractor has computed the amount of heat required and what the room register temperature must be for a room or space. This calculator is offered to heating and air conditioning contractors, engineers, their draftsmen or specification writers, together with an instruction sheet.

◆

265—Reynolds Prefabricated Ducts

Richmond Radiator Co., Inc., Uniontown, Pa., is distributing No. 11, Vol. 3 of "The Richmond Radiator." Pictured are views of the sheet metal division with machines which convert flat sheets of steel into Reynolds streamline, prefabricated air conduit for heating and cooling.

266—Arc Welding Electrodes

General Electric Company, 1 River Road, Schenectady, N. Y., offers Bulletin GEA-1546F, on the selection of G-E arc-welding electrodes. Prepared as a guide for the proper selection of electrodes, the publication gives important suggestions on welding technique with different types of electrodes and presents some of the factors influencing their choice. Descriptions are given of 20 types of G-E electrodes, their applications, sizes, recommended currents, arc-voltages, and identification.

Illustrated with application photographs, this 40-page publication contains characteristics of deposited weld metal, charts of joint forms and positions, and a handy estimator for electrode quantities.

◆

267—Wrought Iron

A. M. Byers Company, Clark Building, Box 83, Pittsburgh, has published a second edition of "Wrought Iron—Its Manufacture, Characteristics and Applications" by James Aston and Edward B. Story, consulting metallurgist and chief metallurgist, A. M. Byers Company (price $1.00). The handbook is dedicated to the need for information on the qualities of the material and their application to present day problems—quality standards, specifications and durability testing, characteristics, forging and bending, welding, principal applications, material selection. A glossary of terms relating to wrought iron manufacture and products is included.

◆

268—Nusteel Stainless Cleaner

Scully Steel Products Company, 1319 Wabansia Avenue, Chicago, is distributing literature describing their NuSteel metal cleaner for stainless steels—a soft paste in one and five-pound tins, or liquid NuSteel for use on all metals in 12-oz. dispensing containers, 11 pound, or 55 pound.

Improved

DETROIT AIR FILTER

● The design and the choice of materials for the Improved Detroit Filter provide high dust removal capacity and unusually long service life. Air resistance, which is extremely low initially, increases only very gradually during the service life of the filter. Thus the Detroit Filter which carries a low initial cost is one of the most economical units available.

Write for Bulletin No. 187

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Precision manufacture and rigid inspection insure accurate sizes and uniform quality.

Rivets are an important trifle. Use the best—Star Brand—the standard of quality for 76 years.

If your jobber or dealer can't supply you—write direct.

COPPER BRAZIERS AND TINNERS' RIVETS
ROUND, FLAT AND COUNTERSUNK HEADS

★ ALSO SPECIALS FROM
BRASS, BRONZE, NICKEL-SILVER
EVERDUR, MONEL, NICKEL
AND OTHER NON-FERROUS METALS

OTHER PRODUCTS
SCREW MACHINE PRODUCTS
STOVE BOLTS - MACHINE SCREWS
MACHINE SCREW NUTS
Special headed & threaded parts made from wire and rod

BLAKE & JOHNSON CO. Est. 1849
WATERVILLE · CONNECTICUT

"PRECISION MANUFACTURED"

Built to exacting engineering design, by exacting production methods, Allen Ventilators not only operate with outstanding efficiency, but have such long life that they frequently outlast the buildings on which they are installed.

There's an ALLEN for every ventilation need that you will be asked to fill, and you assure satisfaction of your customers by always installing Allens.

Ask for our detailed data for your files.

The ALLEN Corporation
9752 Erwin Avenue
Detroit, Michigan

ALLEN TURBINE VENTILATORS

HAVING TROUBLE? —TRY THARCO

The modern Warm Air Furnace would hardly be the splendid heating unit it is if it were not for the furnace cement. That's where Tharco fits into the picture. Compounded of the finest materials obtainable, Tharco is a superior furnace cement in every respect. It's used and approved by the country's leading furnace manufacturers and repair men.

Write for a free sample can of Tharco

MANUFACTURED ONLY BY
THE ARMSTRONG COMPANY
DETROIT · DALLAS · CHICAGO

Outstanding products for over 25 years

REPAIR PARTS

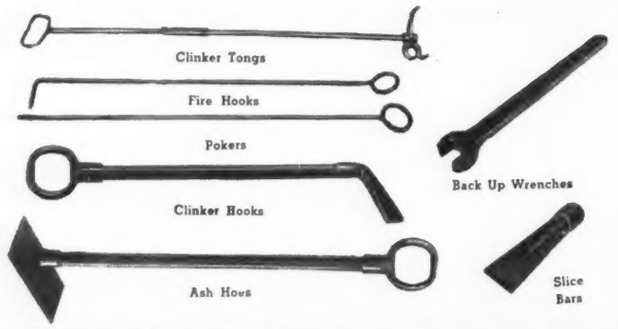
TO FIT ANY STOVE OR FURNACE

The stock of repair parts at Peninsular is the last word in quality and accuracy. Parts to fit any Furnace, Boiler, Stove or Air Conditioning equipment can be supplied at a moment's notice.

Why not order your next repair part from Peninsular? You'll be surprised at the speed and efficient service you receive.

Write us today for catalog.

PENINSULAR STOVE COMPANY
2699 Gratiot Ave. Detroit, Mich.



NOW IS THE TIME TO STOCK

- FARRELL-CHEEK -

QUALITY FURNACE TOOLS

A COMPLETE LINE FOR EVERY NEED

Sturdily constructed, Farrell-Cheek Tools are built to give years of severe usage, and designed to meet practical service requirements. They are efficient, easy to handle and very rigid to withstand abuse. All tools are constructed of durable cast steel with welded pipe couplings.

WRITE TODAY FOR CATALOG AND PRICES

FARRELL-CHEEK STEEL CO. SANDUSKY, OHIO

CONGRESS PULLEYS

Designed to Save You Money

Congress Standardized Drives increase production, because they are accurate and trouble free. Built to the high standards required by the air conditioning industry, there are over 400 sizes and models available for immediate delivery from stock.

WRITE TODAY

For illustrated catalog and full information.

CONGRESS TOOL & DIE CO.

9034 Lumpkin Ave., Detroit, Mich.

New Literature . . . .

For your convenience in obtaining copies of new Literature use the coupon on page 92.

269—Blowers and Fans

International Engineering, Inc., 1145 Bolander Avenue, Dayton, Ohio, is distributing a 20-page catalog (No. 71) covering International blowers and fans for mills and industrial plants—blowers, single and double stage; axial type; Kool-Motor duct booster; stack booster; extended shaft fans; man cooling fans; propeller type; multiblade fans; automatic shutters; pent houses and fan guards. Tables and installation suggestions are included.

◆

270—V-Belt Drives

The Dayton Rubber Manufacturing Company, Dayton, Ohio, is distributing a 40-page catalog (No. 150) covering Dayton V-Belt Drives for fractional horsepower service. Features are given with tables for selecttion of pulley size, pitch diameters and center distance. Reference tables are given for standard pulley combinations in sequence of pulley sizes; overloads and peak loads are discussed and general engineering data is given.

◆

271—Eagle Solders

The Eagle-Picher Lead Co., Temple Bar Building, Cincinnati, is distributing an envelope stuffer covering the Eagle line of solders—wire solder, wiping solder, Jointseal solder, Hi-Temp solder, ASTM auto body solder, spray gun solder, Star solders, Stainless steel solder, Tin-Loy (Tinning compound)—with a list of solder defects and causes of solder failure.

◆

272—Emerson Line of Motors

The Emerson Electric Mfg. Company, 1843 Washington Ave., St. Louis, has issued a new four-page mailing folder X-3558, picturing and briefly describing their complete line of stock motors, 5 H.P. and smaller.

Besides complete performance and price data, a general description of repulsion-induction, capacitor, split-phase, polyphase and direct current motors and their uses, facilitates correct motor selection.

◆

273—"Machete" Airfoil Fans

Aerovent Fan Company, Piqua, Ohio, is distributing a 40-page catalog, the 8th edition, covering their Aerovent "Machete" Airfoil fans. Rating tables are included for the various sizes. Physical fan laws, circumferences and areas in circles, friction of round ducts, rectangular ducts, elbows and bends are given, and a friction and duct sizing chart for round and rectangular ducts is inserted.

◆

274—Exhaust Fans and Ventilators

Propellair, Inc., Springfield, Ohio, is distributing a 20-page catalog entitled "Improved Airfoil Propeller Exhaust Fans and Ventilators" to solve industrial problems. Examples are given from installations in foundry, paper mill, dye house and in solving dust collection problems. Rating tables are included.

◆

275—1940 Directaire Line

Fitzgibbons Boiler Company, Inc., 101 Park Avenue, New York City, is distributing their new Directaire manual covering their 1940 line of direct-fired air conditioners, ranging from 80,000 to 600,000 Btu.

◆

276—Price Sheet No. 3

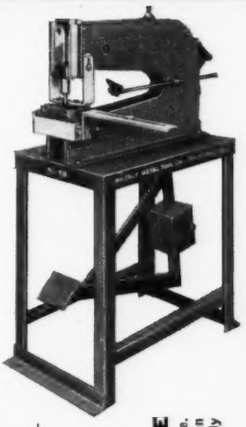
Marion Furnace Co., 2970 West Grand Blvd., Detroit, is distributing Price Sheet No. 3.

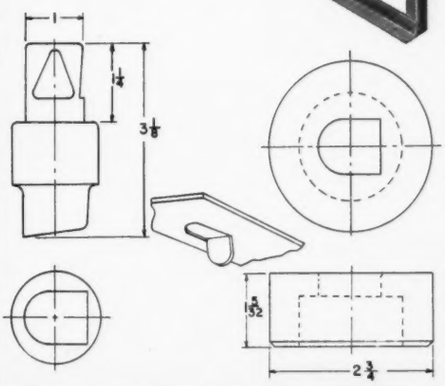
BENDING BRAKES **WHITNEY-JENSEN** METAL TOOLS

PUNCH!

. . . for Speed and Accuracy

Use the fast, easy-working Whitney-Jensen No. 58 or No. 68 Foot Press (shown at right) equipped with special punch and die. Whitney-Jensen Punch and Die Service will help you solve production problems and develop profitable operations. Please write us!





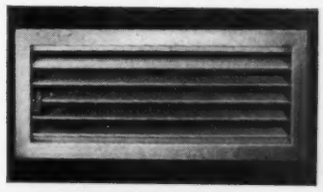
THIS SPECIAL PUNCH and DIE

It is designed for Piercing and Forming Lance. One of many made for use on Whitney-Jensen Foot Presses. Our experience assures properly constructed, profitable tools.

WHITNEY METAL TOOL CO. • 91 Forbes Street, Rockford, Illinois

WATERLOO REGISTERS

EASIER SALES



When you sell Waterloo Registers you really have something to talk about. Outstanding in appearance, they offer Matched Designs, multi-louvre control at the price of single-valve control . . . and many other extra features, at no extra cost.

See how the Waterloo line will fit into your sales for 1940. Send today for Free Illustrated Catalog.

Representatives in Principal Cities

Waterloo Register Company

WATERLOO, IOWA SEATTLE, WASH.

"I Wouldn't Change My Williamson Line"

"The Williamson Heater Company:

I wouldn't change my Williamson Agency for any other line. I have been in the heating business for the past 30 years. I have sold several makes of furneces but Williamson surpasses them all. It is nationally advertised, but the best advertising I have is a long list of satisfied users.

It's easy to sell a Williamson because it takes less fuel to operate and every room is the same temperature with the automatic controls; then too, it's guaranteed for 20 years.

Comfort, convenience, and economy; that's why last year was the biggest year I have ever had."

Signed—XYZ . . . Kentucky.

Complete information; name, address of writer of above letter furnished on request. Phone, wire or write The Williamson Heater Company or nearest jobber.

FREE: Complete, easily understood short method for figuring air-conditioning jobs. You can complete your figures, price job in one hour flat. Write Dept. 2.

THE WILLIAMSON HEATER COMPANY
Cincinnati, Ohio

WILLIAMSON
WARM AIR FURNACES

THERMO-DRIP *is the Humidifier with 3 kinds of* **DEPENDABILITY**

DEPENDABLE EVAPORATION

Thin, uncoated stainless steel pan cannot be beat for quick heat transfer. Even at low bonnet temperatures, there's no lag in evaporation.

DEPENDABLE PERFORMANCE

Drip feed direct to hot pan surface gives almost "flash boiler" vaporizing action and heat-controlled feed governs amount of evaporation.

DEPENDABLE PROFIT-MAKER

Stainless steel construction, absence of mechanical parts, attention-free operation and amazingly low cost gives it "buy appeal."

Write for Complete Particulars

AUTOMATIC HUMIDIFIER CO.

18th and Main Streets CEDAR FALLS, IOWA

THERMO-DRIP *Automatic* **HUMIDIFIER**

Our Northwest room is terribly cold . . . can you help us?
Sure thing . . . I'll bring up a Victor Heat Booster and get you warm in a jiffy!
FLOOR MODEL Contractor's Cost Only $6.00

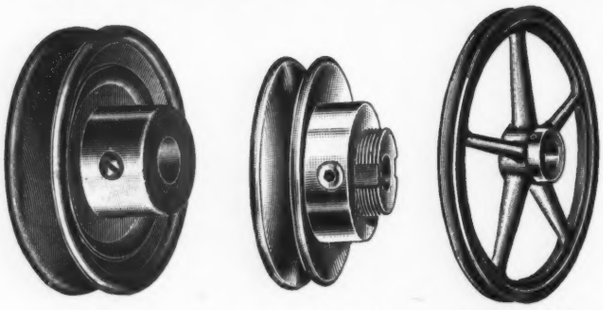
WALL MODEL Contractor's Cost Only $8.65

Extra profits . . . contented customers and all for a few minutes' effort. That's what Victor Heat Boosters can mean to you. This ingenious device installed at the register and connected to nearest electric outlet pulls out the cold air "cork" and brings the heat up in a hurry. Quickly corrects such faulty conditions as long horizontal runs—poorly insulated rooms, etc. Ask your jobber today!

VICTOR ELECTRIC PRODUCTS, INC.
3040 Robertson Avenue Cincinnati, Ohio

VICTOR HEAT BOOSTERS

For Lasting Dependability Install MAUREY V-PULLEYS



STEEL VARIABLE PITCH CAST IRON

Users of V-pulleys quickly discover that they save time and money in Blower, Fan, Stoker, and Air Conditioning installations by using MAUREY Pulleys.

MAUREY V-PULLEYS are designed and built to give the maximum of trouble-free service with F. H. P. motors. They are unusually sturdy, well-balanced and true running. That is why so many users of MAUREY PULLEYS install them year after year. They know that "call-backs" and frequent adjustments due to pulley failures are unnecessary with MAUREY V-PULLEYS.

Write us about your F. H. P. transmission problems. There is a MAUREY V-PULLEY to fit every need. **Ask for Circulars giving descriptions and prices.**

MAUREY MANUFACTURING CORP.
Wabash at 29th, Chicago, Illinois

New Literature . . . .

For your convenience in obtaining copies of new literature, use the coupon on this page.

277—Proposal

Whitney Metal Tool Company, 110 Forbes Street, Rockford, Illinois, has completed a proposal showing the drawings of a number of punches and dies to be used in connection with their Nos. 58 and 68 foot presses, also showing the work each punch and die will do. In addition, the company makes punches and dies on order. There are also sketches of the box fingers which can be attached to bending brakes, in actual operation and a number of jobs that can be completed by the use of them. The box fingers are specially designed for quick attachment and removal and can be had in a wide variety of finger widths.

◆

278—Copper Roofing Products for Roofers

Chase Brass & Copper Co., Waterbury, Conn., is distributing a new catalog covering copper roofing products for the roofer and architect, illustrating and describing a wide range of copper, brass and bronze products for the roofing industry.

Highlights of the book are (1) illustrations and dimensions of all popular sizes and types of copper for roofs, flashings, and rain carrying equipment; (2) a complete section on sheet and roll copper, lead-coated copper, and special products such as through-wall flashing, and Cop-O-Top (a copper membrane flashing); and (3) illustrations of a wide range of miscellaneous products used on roofing and sheet metal jobs.

◆

279—1940 Calendar

David Levow, 308 West 20th St., New York City—roofers and tinners supplies—offers a 1940 calendar having on the back sheet important reference tables giving information of value to roofers and sheet metal workers—wire gauges; expansion and contraction; diameters, circumferences and areas of circles; sizes of drill to be used; and, rules for calculation. Send your request on printed stationery.

◆

280—Soldering Stainless Pipe and Fittings

L. B. Allen Co., Inc., 6719 Bryn Mawr Ave., Chicago, is distributing a picture story of how to solder stainless steel pipe and fittings. Twelve pictures show the various operations step by step. Free samples are offered.

◆

FOR YOUR CONVENIENCE

American Artisan, 6 N. Michigan Ave., Chicago, Ill.

Please ask the manufacturer to send me more information about the equipment mentioned under the following reference numbers in "New Products" and "New Literature." (Circle numbers in which you are interested):

216	217	218	219	220	221	222
223	224	225	226	227	228	229
230	231	232	233			
263	264	265	266	267	268	269
270	271	272	273	274	275	276
277	278	279	280			

Name ..... Title.....

Company .....

Address .....

Are you Manufacturer——Jobber——Dealer——

No Guesswork here!

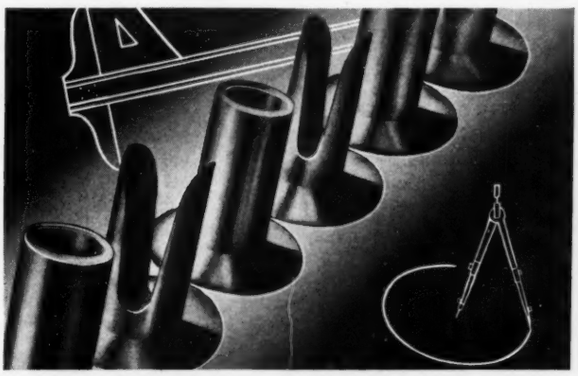
NEW, IMPROVED

MASTER

HEAT REGULATOR

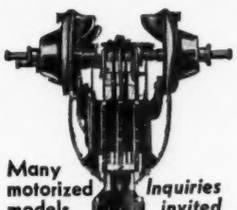
In a special air conditioned chamber at the factory, all Master thermostats are tested and adjusted to operate on a temperature differential of only 1 degree—assuring an unusually high degree of accuracy. This is typical of the exacting care taken at every step in the manufacture of the new, improved Master Heat Regulator. Recognized everywhere as the finest regulator in its price class, the dependable Master Heat Regulator offers many *exclusive* features not found in other makes at comparable prices. A product of the WHITE MANUFACTURING CO., 2362 University Avenue, St. Paul, Minn., makers of scientific temperature controls for more than 20 years.

"BUILT TO OUTLAST ANY HEATING PLANT"



BE SURE TO SPECIFY

The Best Rivets You Can Buy



Many motorized models available in single stroke and multiple drive

Inquiries invited with samples of work you wish to do

The word BEST is applied to T R & S rivets and automatic setting machines as recognition of adherence to the manufacture of a quality product as close to perfection as skill, inspection and processes of manufacture can produce—100% usable, accurately gauged rivets made by the world's oldest and largest Tubular and Split Rivet factory.

TUBULAR RIVET & STUD CO.

World's Foremost Producers of Rivets

WOLLASTON MASSACHUSETTS

NEED A REPAIR PART?

. . . . . if you do, you'll save yourself time and money by ordering it from Capitol's reliable stock. Parts are guaranteed to fit and the quality of Capitol stock has been proven time after time in countless installations.

Write us today for free catalog. You'll get it at once!

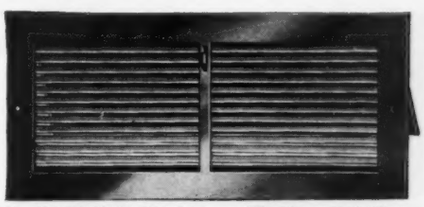
CAPITOL HAS IT!

CAPITOL FURNACE AND STOVE REPAIR CO.

443 E. Washington St., Indianapolis, Ind.

NEW AIR CONDITIONING REGISTERS

The New Rock Island line of Air Conditioning Registers now shown in complete new catalogue just off the press.



No. 822 Wall Register---Horizontal Vanes

The New Rock Island Air-Vane Registers are of bar type fabricated construction—Attractive Appearance—Rigid Construction—Vertical or Horizontal Vanes—Simple, secure adjustment.

New Catalogue and Dealers Net Estimating Book, a time and money saver, gives full particulars, prices, etc.

Mail Coupon Today

ROCK ISLAND REGISTER CO.
Rock Island, Ill.

Mail me a copy of your new catalogue and dealer's net estimating book.

Name .....

Street Address .....

City & State .....

"HAVE CLARAGE MAKE THEM"

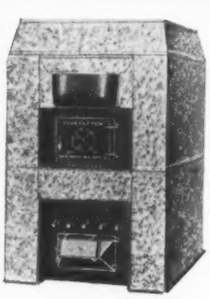
COMPLETE ASSEMBLIES

Every year we ship to furnace manufacturers and to builders of unit air conditioners thousands upon thousands of Clarage Blower Wheels and Assemblies. These smaller units were designed with the same skill characteristic of the larger Clarage equipment — just as carefully constructed — just as carefully tested. And we have sizes to meet ALL REQUIREMENTS — with slow speed operation insuring SILENT PERFORMANCE. May we have your next inquiry?

SPECIFY CLARAGE for COMPLETE AIR CONDITIONING · VENTILATION · HEATING · COOLING · MECHANICAL DRAFT · FANS & BLOWERS FOR INDUSTRIAL NEEDS

CLARAGE FAN COMPANY • Kalamazoo, Mich.
SALES ENGINEERING OFFICES IN ALL PRINCIPAL CITIES

QUALITY EQUIPMENT-- FROM HESS-- COSTS LESS



INCREASED SALES and PROFITS

Are assured if you sell Hess equipment. Why sell ordinary furnaces as sold by mail order concerns and other competitors when Hess offers superior value and performance at low prices.

THE HESS LINE IS COMPLETE

It's Different and Better.

The Hess furnace is rectangular throughout with heavy welded steel innerbody. Hess blower-filter units, oil burners, stokers, and accessories, fill every dealer requirement. Exclusive territory protection. Free plan service. FHA terms. Free consumer literature gives every advantage to a Hess dealer.

WRITE FOR DEALER PORTFOLIO
HESS WARMING & VENTILATING CO.
1211-27 S. WESTERN AVE. Founded 1873
CHICAGO, ILLINOIS

With the Manufacturers . . .

New G-E Executives

Charles E. Wilson, executive vice-president, was elected president and Philip D. Reed, assistant to the president, was elected chairman of the board of directors of the General Electric Company at the meeting of the directors of the Company in New York City, November 17. They will take over their new responsibilities January 1, succeeding Gerard Swope and Owen D. Young, who will become honorary president and honorary chairman of the board, respectively.

◆

Lau Blower Moves

The Lau Blower Company, Dayton, Ohio, moved into its new plant December 1st, E. B. Lau, president, announces, thereby doubling its production capacity and adding to laboratory facilities.

The Lau Company manufactures furnace blower assemblies, blower wheels, blower housings and casings, constant and variable speed pulleys, self-aligning pillow-blocks, and the Lau Niteair Attic Fan line.

Mr. Lau said: "We are setting up a U-shaped production line, in order to make production faster and more economical."

Need for the plant has been felt for some time. 55,000 square feet of floor space make up the new plant at Home and Orchard Avenues, Dayton. It is well lighted and equipped with new industrial equipment.

Railroad track facilities in the rear of the new plant make it possible for the company to bring all materials in one entrance, route them through the production line, and ship them from a separate loading platform.

When completed, the new plant will have over two acres of adjacent grounds which will be used either as a parking lot or for future building expansion.

◆

Continental Steel Announces Promotions

Edmond P. Severns, vice-president in charge of sales for the Continental Steel Corporation, Kokomo, Indiana, announces the following appointments in the sheet division of the company:

John F. McComb, since September, 1937, assistant sales manager of the wire division, has been named sales manager of the Merchants Trade Sheet Division for the company's Kokomo and Indianapolis plants.

A. C. Huber, since July, 1931, assistant sales manager of the Manufacturers' Sheet Division, has been appointed Sales Manager of the Manufacturers' Sheet Division, for the company's Kokomo and Indianapolis plants.

Hoyt Shepard, since 1930 assistant sales manager of the Sheet Division, has been named assistant to the general sales manager.

W. Paul Irwin continues as sales manager of The Superior Sheet Steel Company, Canton, Ohio, a Continental subsidiary.

◆

Obituary

The wife of Vice-President W. L. Rybolt of the Rybolt Heater Company, Ashland, Ohio, passed away on October 14. Mr. Rybolt is a past president of the National Warm Air Heating and Air Conditioning Association.

"THE 400"

COOK HEAT CONTROL

Sure, we **knew** "The 400" was good, knew we'd get a big lift in sales when we introduced it. But we didn't even hope for the sensational sales dealers are giving us—yet there are plenty of good reasons why. Find out for yourself—get all details.

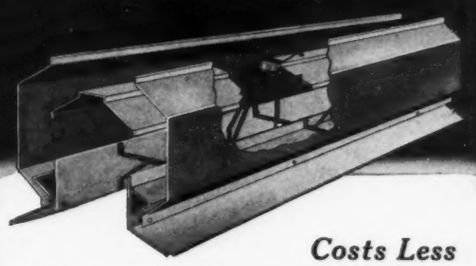
SEE YOUR JOBBER

COOK ELECTRIC COMPANY

2672 Southport Ave. Chicago, Ill.

BURT Monovent

Continuous Ridge VENTILATOR



Costs Less

Fully as Efficient—Looks Better

You can land the job when you recommend Monovent because it has everything the contractor or owner is looking for—the same efficiency as unit ventilators at one-third less cost, together with harmonious attractive appearance. Very easy to install. Comes in all materials. Fits any type of roof or deck. Send for catalog of complete line and let Burt Engineers help you estimate and lay out plans.

THE BURT MFG. CO.

Roof Ventilators • Oil Filters • Exhaust Heads

301 MAIN STREET AKRON, OHIO

PERFORATED METALS

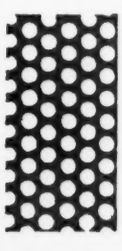
Every Sheet Metal Worker needs perforated metal in one form or another.

For processing food products and to withstand certain chemicals, perforated Stainless Steel and Monel Metal are much used.

Factory Safety Guards—For this service perforated metal has no equal.

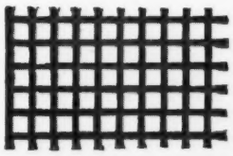
For Grilles, Radiator Enclosures, Air Conditioning Cabinets, we have many beautiful designs.

Write today for information and prices.



You'll like H&K prompt, satisfying work and pleasing prices.

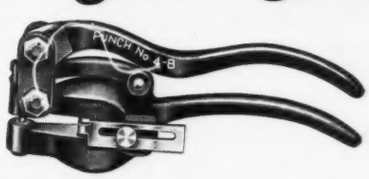
Perforators of metals since 1883. Send us your specifications.



The Harrington & King PERFORATING CO.

5649 Fillmore St., Chicago, Ill. New York Office, 114 Liberty St.

A REAL *Time Saver*



The No. 4B PUNCH by *Whitney*

This punch is accepted by leading contractors and dealers as a real time-saver in the shop and on the job. Men who use it every day know it can't be beat for clean, fast punching. Has a capacity of 1/4" through 16 ga., weighs 3 pounds, 8 1/2" in length, depth of throat, 2". Complete tool includes three punches and three dies of specified sizes with die adjusting key.

W. A. WHITNEY MFG. CO.

636 RACE ST. ROCKFORD, ILL.

With the Manufacturers . . .

Marr Sales Manager of Heating

Earl Marr

Airtemp Division of Chrysler Corporation, Dayton, Ohio, has appointed Earl Marr, a veteran official of the Oil Burner Institute, as Sales Manager of Heating, according to an announcement by A. C. Downey, president.

Mr. Marr has been chairman of the Legislative Committee of the Oil Burner Institute for more than 10 years. From 1931 to 1939, he was manager of the oil burner division of Westinghouse Electric Supply Company.

Sales of cooling equipment will continue under the direction of B. S. Williams, Sales Manager of Cooling.

◆

New International Nickel Officials

James L. Ashley, secretary and treasurer of The International Nickel Company of Canada, Limited, who has been an executive since the formation of the original International Nickel Company in 1902, has elected to retire from these positions under the Company's Retirement System, it was announced by Robert C. Stanley, Chairman and President.

Mr. Ashley will continue to serve in an advisory capacity for several months. He remains as a director of The International Nickel Company of Canada, Limited and its various subsidiaries.

William J. Hutchinson, who served as a director for approximately ten years and a member of the Executive Committee of the present Canadian Company since 1928, and who resigned both offices in 1934, due to pressure of other business, was elected to succeed Mr. Ashley as Treasurer. He was also elected a director to fill the vacancy on the board caused by the resignation of William W. Mein, of San Francisco, California.

Henry S. Wingate, Assistant to the President of the International Nickel Company, Inc., was elected Secretary of the parent Company.

Viking Moves Into Larger Factory

Viking Air Conditioning Corporation, Cleveland, manufacturers of air circulating equipment, is moving into a new factory at 9500 Richmond Avenue, with more than three times the floor space formerly occupied. The building is of modern brick construction with a separate warehouse and shipping building. The general offices of the company will be located at the same address in an air conditioned office building.

◆

C. A. Olsen Organizes Company

The C. A. Olsen Manufacturing Company has just been organized with headquarters at Elyria, Ohio.

The company has acquired a large plant at Elyria owned by The American Rolling Mills Company of Middletown, Ohio, which is being modernized and renovated to manufacture gravity warm air furnaces, winter air conditioning units for gas, oil and coal and blower units.

C. A. Olson

E. C. Carlson

Almon Chapin

C. A. Olsen who heads the company has been active in the industry for many years as president of The Fox Furnace Company, Elyria, Ohio, a subsidiary of The American Radiator and Standard Sanitary Corp., and as vice president of The National Warm Air Heating and Air Conditioning Association.

E. C. Carlson has been appointed secretary and treasurer of the new company. Mr. Carlson was for many years associated with the Lennox Furnace Company, and later general manager of the Armstrong Furnace Company.

Almon Chapin has been appointed production manager of the new company. Mr. Chapin was for several years associated with The Fox Furnace Company on production, research and development work.

The new company will use the trade name "Luxaire."

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STRONG, RIGID, LARGE OPEN AREA

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Conductor Fasteners . Mitres . End Pieces and Caps
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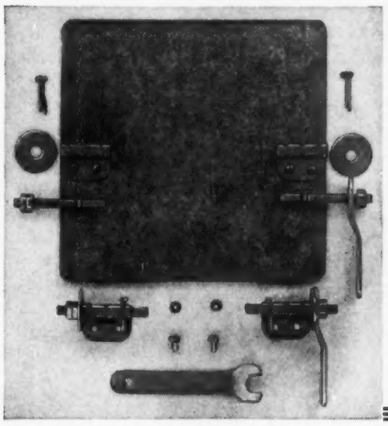

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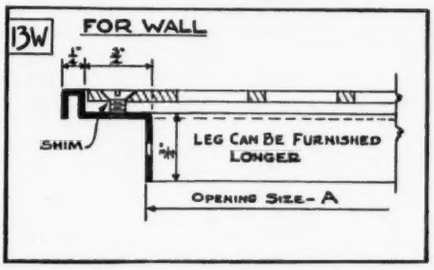

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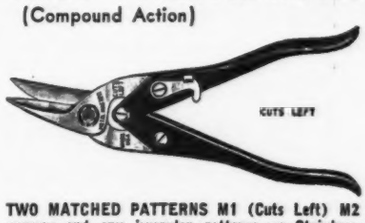

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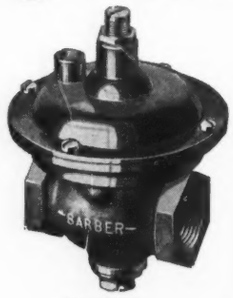

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FULLY GUARANTEED

BREMIL MFG. CO. Erie, Pa.

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W. L. Seelbach

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The new location comprises a tract of land of about four and a half acres located on Cremo avenue in Middletown. The buildings consist of one three-story and three one-story buildings, all of substantial brick construction. All of the buildings are being inter-connected and each has its direct access to a spur track, as well as truck loading platforms. The spur track is connected with the Pennsylvania Railroad. Rail service is also available from the Big Four and the Baltimore and Ohio railroads.

An important advantage is the proximity to the American Rolling Mill Company, one of the chief sources of supply for raw material—galvanized sheets, Armco copper-bearing sheets and Armco ingot iron galvanized sheets.

The officers of the company, headed by Mr. Miller, as president, are: J. K. Dougherty, Vice-President; R. B. Thompson, Secretary; J. E. Watt, Treasurer; and W. S. Somers, Chief Engineer and Production Manager.

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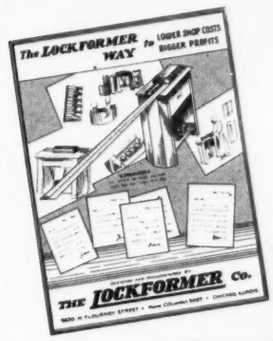

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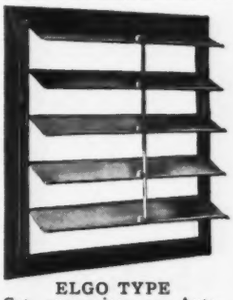

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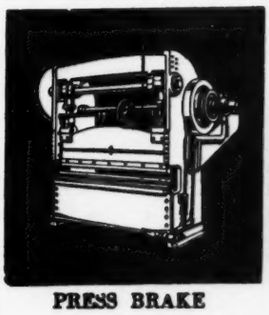

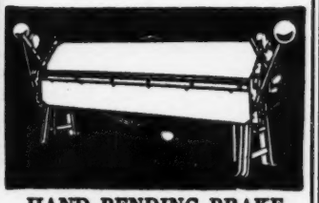

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KLENK'S Double Action Aviation Snips

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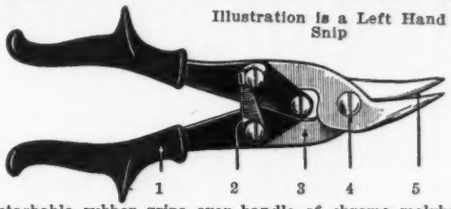

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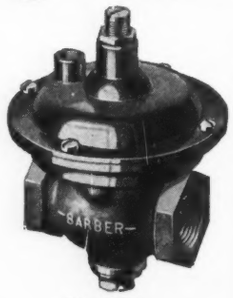

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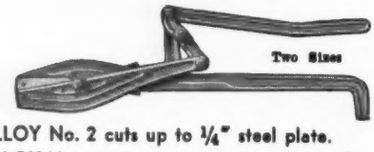

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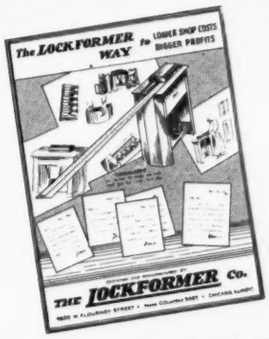

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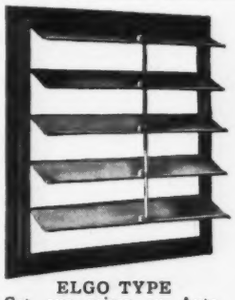

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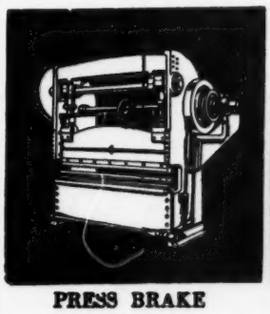

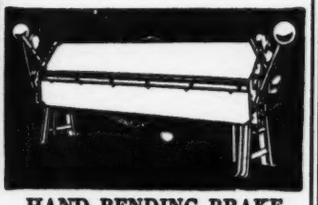

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PEERLESS FOUNDRY CO., 1853 Ludlow Ave., Indianapolis, Ind

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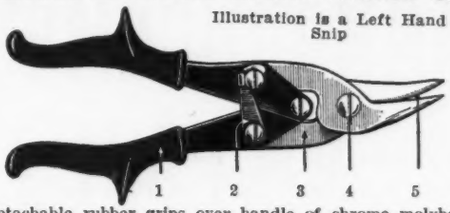

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5. Curved jaws for cutting ends of tubing to .065 in. wall

BIG VALUE—LOW COST—A trial will convince you. Made for both right and left hand—straight or curves—Easy to work—Order today.

KARL KLENK'S AVIATION SNIPS
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Lunching, dining or staying at the Bellevue is to see the real Philadelphia. Famous people and important events just naturally gravitate to the renowned hotel. You will enjoy its superb service and moderate prices.

BELLEVUE-STRATFORD

IN PHILADELPHIA

CLAUDE H. BENNETT
General Manager

DID YOU MAKE A NOTE OF THE IMPORTANT ANNOUNCEMENT ON PAGE 46?

With the Manufacturers . .

Burner-Parts Changes Name

E. C. Stauffer announces that the name of the Burner-Parts and Service Corporation, located at 359 North Market Street, Lancaster, Pennsylvania—manufacturing Penn-boiler burner units, air conditioning units, gun-type oil burners, and automatic draft regulators—has been changed to Penn Boiler and Burner Mfg. Corp., and the company has moved into new quarters with floor space increased from 2,400 to 13,000 square feet.

J. B. Stauffer, formerly associated with the G. E. air conditioner and boiler burner unit of Portland, Oregon, has joined the company as manager and purchasing agent. H. C. Altenburg has been appointed as Southeastern sales manager. S. G. Bowman has been elected secretary and the other officers are now E. C. Stauffer, president, V. B. Stauffer, vice-president and treasurer. The company is a closed corporation and the stock is held by E. C. and V. B. Stauffer.

◆

Lau Inaugurates Larger Research Laboratory

The Lau Blower Co., Home and Orchard Avenues, Dayton, Ohio, has installed new equipment for solving problems of moving air.

Several thousand dollars have been spent in equipping the laboratory section of the Lau Company's new building, with special emphasis on the most modern equipment for sound detection.

The latest available scientific instruments have been installed, and the research staff has been enlarged in order to make more complete research work possible.

The company extends a special invitation to those who have special designs in mind or who have sound or vibration problems which need solving.

◆

L. B. Miller Joins Perfex

Perfex Corporation, Milwaukee, Wisconsin, announces that L. B. (Pat) Miller has joined its Automatic Control Division in a sales executive capacity.

"Pat" is one of the pioneers of the control industry. With E. N. McDonnell, he founded the firm of McDonnell & Miller. In 1929, he joined the Time-O-Stat Controls Company of Elkhart, Indiana as assistant sales manager, purchased by the Minneapolis-Honeywell Regulator Company in 1931 and "Pat" took charge of the Refrigeration Control Division. He introduced the Polatron System of Refrigeration Control, and managed this activity until his resignation in June of this year.

◆

Baker General Sales Manager

As a further step in its plans for aggressive merchandising and sales activity in 1940, the Williams Oil-O-Matic Heating Corporation, Bloomington, Illinois, announces the appointment of Samuel F. Baker as general sales manager. In this capacity Mr. Baker will be directly responsible for Oil-O-Matic oil burner, Ice-O-Matic refrigeration, and Air-O-Matic air conditioning sales.

◆

Faulkender Joins Lau

Harold Faulkender, efficiency engineer, has joined the staff of the Lau Blower Company, Dayton, Ohio, to assist in plant management and improvement of manufacturing methods.

Obituary

The death is reported of William D. Estey, a tinsmith and plumber of Colville, Wash.

SERVICE SECTION: Rates—$5.00 per inch per insertion. One inch minimum. **CLASSIFIED SECTION:** 5 cents for each word including heading and address. Count seven words for keyed address. $1.00 minimum. Cash must accompany order.

AMERICAN ARTISAN Service Section

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Try out these 1¼-ounce Room Thermosts whenever you have trouble with "poor response", "wall influence", "inaccuracy"—You will be amazed.

Quality, modern appearance, 2 wire low voltage—list $4.65. Liberal trade discounts.

WRITE FOR THERMOSTAT FACTS

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SHEET METAL WORK
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PATTERN DRAFTING
in
America's Oldest Trade School
An endowed institution, not operated for profit.
Term beings Feb. 5th. Send for catalogues.
NEW YORK TRADE SCHOOL
322 East 67th Street New York City

Classified

AGENTS OPEN

WANTED: Manufacturer agent to handle heating dealer equipment through jobbers. State territory covered and other lines now handled. Address Key No. 477, American Artisan, 6 N. Michigan Ave., Chicago, Ill.

SITUATIONS OPEN

SALESMEN: Open territory in Wisconsin and Ohio after Jan. 1, 1940. Complete line Gas, Coal and Oil Furnaces and Air Conditioners. Steam and Hot Water Boilers, Radiation and Water Heating Equipment. Experience war air work necessary. Some established business. Commission basis only. Address Key No. 479, American Artisan, 6 N. Michigan Ave., Chicago, Ill.

SITUATIONS WANTED

WANTED: Complete line of warm air furnaces to sell to the trade in Missouri and Kansas. Address Key No. 474. American Artisan, 6 N. Michigan Ave., Chicago, Ill.

Heating and air-conditioning engineer, now employed, is seeking a suitable opening for a high-caliber man. Excellent background and broad experience in heating, ventilating and air-conditioning. Formerly Chief Engineer large American Company, consulting practice, managerial experience. Best of references. Age 36. Address Key No. 480, American Artisan, 6 N Michigan Ave., Chicago, Ill.

Position wanted by Plumber, Sheet Metal and Furnace man with 20 years of experience. Address Wm. Meyer, 2028 N. Third St., Milwaukee, Wisconsin.

FOR SALE

FOR SALE: Shop equipment and tools for complete sheet metal shop. Located mid-western city of 40,000 population. Address Key No. 481, American Artisan, 6 N Michigan Ave., Chicago, Ill.

Use AMERICAN ARTISAN Classified Advertising for quick results. It puts you in direct touch with the buyers and sellers in the warm air heating, sheet metal contracting and air conditioning industry.

SEND FOR YOUR FREE COPY TODAY

CATALOG 393 contains complete descriptions and listings of America's Largest Stock of New, Rebuilt, and Used Punch Presses, Sheet Metal Machinery and Machine Tools.

Describes OVER 2,000 TOOLS in stock for immediate shipment. Completely indexed. Full specifications. Over 200 illustrations, 52 pages. Durably bound for permanent reference.

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Easily and quickly operated. Soon pays for itself.

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A simple and inexpensive machine for forming round bead.

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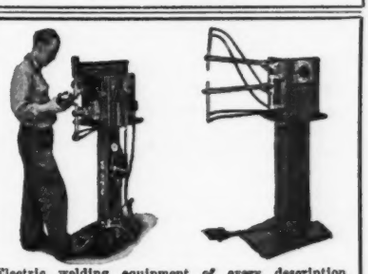

Electric welding equipment of every description to weld from a watch case to a door. Special or standard SPOT WELDERS from ¼ to 500 K.V.A. A.C. Arc Welders from 100 to 400 Amps. We invite contract Spot Welding in large or small quantities.

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CHAS. EISLER, PRES.
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STRAIGHT—CIRCULAR—IRREGULAR CUTTING OF SHEET METAL

BEVERLY cuts flat to any size or shape. Three sizes: No. 1, weighs 16½ lbs.; cuts up to 14 gauge. No. 2, weighs 32 lbs., cuts up to 10 gauge. No. 3 weighs 55 lbs., cuts up to 3/16 gauge.

Write for circulars and prices.

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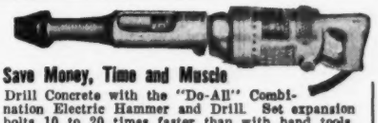
3004 W. 111th St. Dept. 2 Chicago, Illinois



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Custom fabrication of all alloys with satisfaction guaranteed. Send blueprints for prices and delivery. Years of experience guarantee responsible and accurate work. TERMS CASH WITH ORDER. Write today for further information.

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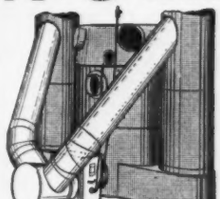

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PONTIAC ILLINOIS

BLOWER FAN HOUSINGS
of
Standard Dimensions

Individual parts or complete units. Housings for wheel sizes 4½" to 9".

Send for Blow-Aire Blower Housings bulletin, it shows detail drawings and gives dimensions along with other important information.

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13c ¼" RIBBED WIRE GLASS
Per Sq. Ft.—Plus Boxing
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STOCK SHEETS—CASE LOTS
Reasonable freight rates to all parts of U. S. A.
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Cut sizes—2c per sq. ft. additional.
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Trouble with any automatic heating equipment, no matter if it happens several years from the time of purchase, is bound to breed discontent, and no discontented customer is likely to recommend anything with which he has experienced trouble. Many a potential sale has been killed that way. ¶ Every manufacturer or dealer of automatic heating equipment must seriously take into consideration, the elimination of all things that cannot successfully stand the test of time. This is particularly true of automatic controls. ¶ The value of controls is to be judged by the dependable service they render after they have been in use for a period of years. It is upon this basis that Mercoid Controls merit a favorable consideration—They are built to endure. ¶ One of the distinguishing features of Mercoid Controls is the exclusive use of mercury sealed contact switches. They cannot be affected by dust, dirt or corrosion, which are some of the common causes for control failure. ¶ Lay the foundation for future satisfaction as well as for the present by using Mercoid Controls. ¶ There is a Mercoid Control for every automatic heating demand. Send for complete Mercoid catalog containing full information.

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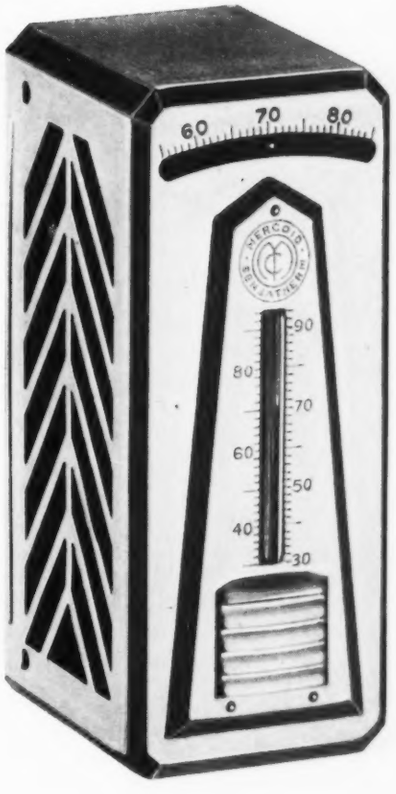

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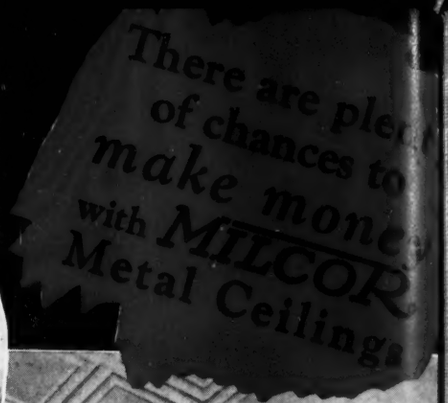

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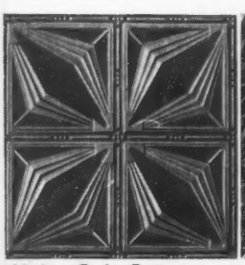

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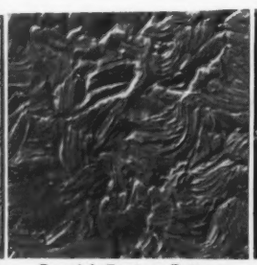

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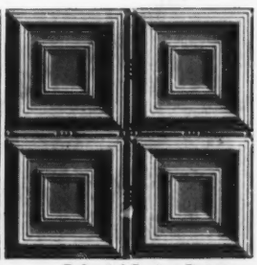

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